

AMERICAN METEOROLOGICAL SOCIETY

Illinois U Library

meteorological



abstracts and bibliography

Sponsored by
AIR FORCE CAMBRIDGE RESEARCH CENTER

Bibliography on Global Solar Radiation, p. 829

Annotated Bibliography on Cloud Physics (1951-1953), p. 856

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of important references on a special subject. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues of Vol. 1, 1950 were:

Atmospheric Pollution, 2) Aerobiology, 3) Cloud Physics, 4) Hail, 5) Tornadoes, 6) Volcanic Eruption, 7) Climatic Changes, 8) Thunderstorms, 9) Icing, 10) Acoustical Propagation and 11) Evaporation.

Those published in Vol. II, 1951 were:

Extended Forecasting, 2) Long Range Forecasting, 3) Soil Temperature, 4) Constants, Tables, etc., 5) Climate of Near East, 6) Climate of Middle East, 7) Special Winds, 8) Radar Storm Detection, 9) Condensation Trails, 10) Climate of Northeast Africa and 11) Mountain Meteorology.

Other bibliographies previously published were:

No.	Mo.	Vol. III, 1952	Vol. IV, 1953
1.	Jan.	Climate—Northwest Africa	Turbulence Theory
2.	Feb.	Carbon Dioxide	Turbulent Diffusion and Exchange
3.	March	Climate—Argentina, etc.	Frost and Frost Forecasting
4.	April	Dew	Climate of Australia and New Zealand
5.	May	Objective Forecasting	High Level Winds (500–100 mb)
6.	June	Stratus Forecasting	High Level Winds (above 100 mb)
7.	July	Urban Climatology	Jet Stream
8.	Aug.	Climate—Central Africa	Radiation Bioclimatology
9.	Sept.	Visibility	Climatology of the Pacific
10.	Oct.	Glaze and Rime	Auroras
11.	Nov.	Free Air Turbulence	Sferics

Bibliographies published this year are:

1. General Oceanographic Meteorology, Vol. V, No. 1, Jan. 1954
2. Climate of Southeast Asia and Netherlands Indies, Vol. V, No. 2, Feb. 1954
3. Physics of Auroras, Vol. 5, No. 3, March 1954
4. Tropopause, Vol. 5, No. 4, April 1954
5. Balloons, Vol. 5, No. 5, May 1954
6. Numerical Forecasting, Vol. 5, No. 6, June 1954
7. Radiation Data, Vol. 5, No. 7, July 1954

Forthcoming bibliographies will be:

8. Vertical Motion, Vol. 5, No. 8, Aug. 1954
9. Climatology of the Arctic Basin, Vol. 5, No. 9, Sept. 1954

Other bibliographies in preparation are:

<i>Actinometers</i>	<i>Night Airglow</i>
<i>Arctic Synoptic Meteorology</i>	<i>Ozone</i>
<i>Climate of the Arctic</i>	<i>Singularities</i>
<i>Cosmic rays in the atmosphere</i>	<i>Snow Cover</i>
<i>Engineering Meteorology</i>	<i>Synoptic Aerology</i>
<i>Fog Forecasting</i>	<i>Tropical Cyclones</i>
<i>Microwave Propagation</i>	<i>Wind Waves and Currents</i>

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the December issue cumulative author, subject, geographical and journal indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where material may be found. The Union List of Serials (Gregory) is the source of most of symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society) Library, Milton, Mass.
MCM:	Massachusetts Institute of Technology, Cambridge, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
!	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146-151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, Jahrgang 2 (1950), Heft 5/6 (No. 5/6), pages 146-151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

WORKS OF SPECIAL INTEREST

5.7-1

551.521.12(569.4) 551.525(569.4)

*Ashbel, Dov, **Solar radiation and soil temperature**. Jerusalem, Hebrew Univ. Press soc., 1942. 125 p. 89 figs. and tables, refs. p. 71, 73, 118. In Hebrew; added title page, contents, and list of illustrations in English. DWB—Pt. I, which is concerned with solar radiation, contains a description of various instruments for measuring the intensity of the different parts of the spectrum and a brief elementary discussion of the laws of radiation, refraction, etc. and extensive radiation data for Palestine. The latter include 10 year means of radiation intensity on a normal and horizontal surface for various altitudes and times of day, daily and hourly data, intensity of sun's rays on walls facing 8 directions, on a flat roof and on different slopes; ultraviolet intensity measurements on seashore, inland, the Jordan and Dead Sea depression, brightness measurements, long wave radiation of the atmosphere, etc. Pt. II "Soil temperature" contains a discussion and data on the heat balance of the soil, influence of soil cover upon soil temperature, amount of heat needed for evaporation from soil, the effect of microrelief upon soil temperature, heat conductivity of the soil, daily and seasonal march of soil temperature, regional distribution of soil temperature in Palestine and a comparison of soil temperature in Palestine with that in Egypt, Lebanon, Syria, Turkey, Caucasus, Central Europe and Leningrad. *Subject Headings:* 1. Solar radiation data 2. Radiation instruments 3. Soil temperatures 4. Israel.—I.L.D.

5.7-2

551.594.13:551.510.535

Baker, W. G. (*Amalgamated Wireless Australasia, Ltd.*) and Martyn, D. F. (*Radio Research Board of Australia*), **Electric currents in the ionosphere**. Parts I, II, III. *Royal Society of London, Philosophical Transactions, Ser. A*, 246(913):281-320, Dec. 16, 1953. figs., s., eqs. DWB—In the first paper the authors examine quantitatively the theory that the effective conductivity of the ionosphere in the dynamo theory is enhanced by the polarization of the Hall current. The effective conductivities over most of the earth were found to satisfy this theory. In a narrow strip at the equator the conductivity is enhanced, accounting for the excessively large magnetic variations found there. In the second paper (by BAKER) three examples are given of the flow of current in plane sheets, due to the application of steady electric fields, for cases where this inhibiting polarization is absent, partial or complete, respectively. In the third paper (by MARTYN) the mass motion and velocity of the ionization of the ionosphere under the influence of an electric field, and/or atmospheric wind are discussed. *Subject Headings:* 1. Ionospheric currents 2. Dynamo theory 3. Wind effects in ionosphere. M.R.

5.7-3

551.594.7:06

Conference on Radio Meteorology, Univ. of Texas, Austin, Nov. 9-12, 1953, **Proceedings**. [1.] Conference sponsored by The American Meteorological Society; The Institute of Radio Engineers; The Radar Weather Conference; The International Scientific Radio Union; The Joint Commission on Radio Meteorology of the International Scientific Unions. Austin, Bureau of Engineering Research, Univ. of Texas, 1953. Each section renumbered. Pref. Vol. 2 to be entitled Supplement to the Proceedings to be published within a month or so after the conference." DWB—Short versions or summaries of 61 papers on Tropospheric Propagation; Refractive Index; Atmospheric Scattering and Turbulence; Thunderstorm and Tornado Atmospherics; Cloud and Precipitation Physics and use of Weather Radar, as presented at the sessions on those topics during the Conference on Radio Meteorology Nov. 9-12,

1953 at Austin, Tex. The remaining papers and supplementary material, discussions etc. comprise the second volume of the two. Papers will be abstracted separately for *MAB* contents listed in Pt. III. *Subject Headings*: 1. Radio meteorology conferences 2. Radio meteorology 3. Austin, Tex.—*M.R.*

5.7-4

551.582.3(434.

*Germany. Deutscher Wetterdienst, *Klima-Atlas von Baden Württemberg*. [Climatic atlas of Baden-Württemberg.] Bad Kissingen, 1953. loose leaf. 37 p. of text. 75 mm. 9 diag. *DWB*—This is the fourth of these excellent loose-leaf climatic atlases issued by German Weather Services during the past 5 years (see 2C-177 in March 1951 for Hesse 4.2-4, Feb. 1953, *MAB* for Bavaria and 5.4-2, April 1954 for East Germany). The charts, mostly in color, showing isopleths of all of the standard and a number of unusual climatic and phenological elements, and black and white charts showing statistical distribution of mean temperatures or rainfall for the month or year, etc. are all done with great care and imagination. The accompanying text and explanatory manual describes the materials, compilation as well as interpretation of each chart and gives brief analyses of the data and supplementary tabular data for selected stations. Thus an unusually complete picture of individual climatic elements in each locality, or in the region as a whole, can be obtained with much difficulty. *Subject Headings*: 1. Climatic atlases 2. Climatic charts 3. Climate of Baden-Württemberg 4. Baden-Württemberg, Germany.—*M.R.*

5.7-5

551.556:551.4

Goldsbrough, G. R., *Wind effects on the motion of the sea in an infinite channel and rectangular gulf*. *Royal Society of London, Proceedings, Ser. A*, 222(1151):477-489, March 23, 1954. table, 2 refs., 30 eqs. *DWB*—The work first examines the effect of a steady wind on the motion and surface disturbance of the sea in an infinitely long uniform channel, and then in a uniform gulf resembling the North Sea. It is found that surface disturbance at any point decreases with increasing depth, for same wind force, and that a transverse wind is more effective than a longitudinal wind in producing a surface displacement. The effect of a longitudinal wind varies with the depth (20-60 fathoms). *Subject Headings*: 1. Wind effects on water surfaces 2. Wind waves.—*C.E.P.B.*

5.7-6

551.508

†Jones, E. B., *Instrument technology. Volume 1. Measurement of pressure, flow and temperature*. London, Butterworth, 1953. 315 p. 235 figs., 19 tables, 75 eqs. *GB-MO*—The terms accuracy, precision, and sensitivity, for performance of an instrument are defined. Absolute and differential pressure measurement is discussed, with a table of suitable fluids and their densities and advantages. Manometers, Bourdon gauges, aneroids, etc. are fully illustrated and calibration described. Pt. 2 describes measurement of level: hook type, sight glass, float-actuated mechanisms and electrical methods, and variable pressure-operated types. Pt. 3 deals with flow-meters, quantity meters and rate-of-flow meters for liquids and gases, including cup anemometers and air meters, manometers, tubes, etc. Pt. 4, measurement of temperature, describes the various thermometric scales: expansion thermometers (bimetal strip, various types of mercury-in-glass, mercury-in-silver, Bourdon tubes, etc.). Electrical methods are described under resistance bulbs, thermoelectric junctions, moving coil, bridge and potentiometric methods. The last section deals with pyrometers. *Subject Headings*: 1. Meteorological instruments 2. Instrument technology.—*C.E.P.B.*

5.7-7

55

†*Khrigian, A. KH., *Fizika atmosfery*. [Physics of the atmosphere.] Moscow, 1953. 456 p. 220 figs., (some fold.), 119 tables, numerous refs., eqs. *DAWS* (Air Weather Tech. File)—This is the first time in a score of years that a competent and original text on Physics of the Atmosphere (as distinguished from physical meteorology) has appeared in any language. The author published an equally authoritative and scholarly book on the "Theory of Meteorology," more thorough and modern than Vol. I of SHAW's "Manual of Meteorology," about 1948. He has also published a number of technical articles on cloud physics

in many other fields of physical meteorology. Here he has done a thorough job of reviewing, in an original systematic manner, the many classical and a number of modern phases of meteorology as can be seen from the contents alone. The theory, diagrams, charts and data selected for illustrative purposes and the references or sources are faithfully and accurately cited in all but a few cases. The main value, however, lies in the up-to-date review of a vast amount of research and literature that has not yet come to the attention of the scientific world in general, although most of it has been available in the larger libraries of America, England and France. The successive chapters in this text are entitled: 1) Composition of the atmosphere, 2) Ozone, 3) Atmospheric dust, 4) Water vapor, 5) Theory of atmospheric dynamics; Pressure, 6) Adiabatic processes, 7) Radiation balance and solar radiation, 8) Terrestrial and atmospheric radiation, 9) Heat exchange in soil and water, 10) Temperature distribution in surface layers of air (large and medium scale), 11) Radiation and heat balance at or near the ground, lapse rate, 12) Upper air temperature, 13) Evaporation and diffusion, 14) Condensation and sublimation, 15) Clouds and fog, 16) Cloud physics, 17) Precipitation, 18) Wind and kinematics of air currents, 19) Geostrophic and gradient winds, friction, turbulence, Coriolis force, etc., 20) Cyclones and fronts—forecasting, 21) Local winds, 22) General circulation and monsoons. The reader will notice the fact that there are numerous citations to the most recent literature mostly from the Soviet Union, but a few from western sources, such as HOWELL (1949), STOMMEL (1947), FARBEL, WEICKMANN (1947), KUMAI (1951), DAISUKE (1951), WOODCOCK (1950), GERSON (1952), NAZAREK (1950), WHIPPLE (1952), COX (1949) and a few charts from sources such as the hurricane structure chart reproduced on p. 383 [WEXLER (1947)], which he failed to credit to the author, perhaps because he used them second-hand. Recent discoveries in atmospheric physics such as the sodium content of the upper atmosphere, CO_2 absorption of solar radiation in upper atmosphere, composition of the ionosphere as deduced from auroral spectra, the gaseous "tail" of the earth's atmosphere, dissociation and recombination of O_2 in production of O_3 , etc., advection of O_3 , relation of turbulence to dust, velocity of dust fall, sand movement by wind, radar storm detection, charts of baric topography at various levels, tropopause dynamics, rocket research in U.S.A., cloud physics and rain making. In short, the text is like a combination of BYERS' and MITRA's texts with emphasis on Russian sources. (Same item as D-243, April 1954, MAB.) *Subject Headings:* 1. Atmospheric physics 2. Cloud physics 3. Textbooks.—M.R.

5.7-8

551.571.7:016:019.941

†Miller, Lewis E., *Vertical distribution of water vapor in the stratosphere and upper atmosphere*. U. S. Air Force. Cambridge Research Center, AFRCRC Technical Report, 53-31; *Air Force Surveys in Geophysics*, No. 45, Sept. 1953. 118 p. tables, graphs, 149 refs. (118 of which are abstracted), eqs. **MH-BH**—An intensive and extensive review of the literature in many aspects of observation or determination of water vapor content in the upper atmosphere. The historical review, theory, discussion of instruments and methods, analysis of results and presentation of quantitative data in tabular and graphic form occupy the first portion. Abstracts of about 150 articles and a bibliography arranged chronologically by subject area, plus an author index make this a valuable reference source. A few items on mother-of-pearls clouds, auroras and night sky light are included as they have bearing (indirectly) on water vapor content. *Subject Headings:* 1. Water vapor in stratosphere 2. Abstracts 3. Bibliographies.—M.R.

5.7-9

551.511:551.513

†Pisharoty, P. R., *The kinetic energy of the atmosphere*. California. Univ. at Los Angeles. Dept. of Meteorology, Contract AF 19(122)-48, Scientific Report No. 6, Feb. 1954. 40 p. 27 figs., tables, bibliog. p. 137-140, eqs., append. all figs. **MH-BH**—A voluminous report which gives an analysis of the various factors affecting the exchange of kinetic energy between the earth and atmosphere, or within the atmosphere. After a brief introduction the author gives the computations of *total kinetic energy* from day to day for Jan. and Feb. 1949 based on daily synoptic charts of N. Hemisphere analyzed by the General Circulation Project of the U.C.L.A. Then the author gives a computation of the daily values of *kinetic energy of the mean zonal motion* in different latitude rings. In Sect. 4 he shows the daily values of kinetic energy of *superimposed perturbations* taken from above values. Sect. 5

describes computation of *geostrophic flux of kinetic energy* across latitudinal walls (poleward Sect. 6 deals with convergence or divergence of this flux. A comparison is made between the daily changes in total K.E. and the *flux divergence of kinetic energy* in Sect. 7 and the *dissipation of kinetic energy* in Sect. 8. In Pt. II, which deals with the changes in kinetic energy of large scale eddies, the eddies of sub-continental dimensions and the kinetic energy of zonal motion are examined to see what processes result in these day to day changes or interchange between perturbations and mean motion. Chart for Jan. and Feb. 1949 for different zonal rings at 300 mb level were analyzed and areas of generation and areas of consumption of kinetic energy were found in different days. The changes at 200, 500 and 700 mb level were also studied. Finally, synoptic studies of non-geostrophic production of kinetic energy perturbations were made and are presented. The main source of kinetic energy was found to be from the equator to 30°N and a secondary source from 45° to 50°N, whereas a sink was found at 30° to 45°N and from 50°N to the pole. The production and consumption of kinetic energy is smaller at 500 and 700 mb than at 300 and 200 mb. *Subject Heading: 1. Kinetic energy in atmosphere.*—M.R.

5.7-10

551.511:551.525:551.526:0

†Schumann, T. E. W. and Burdecki, F., *The seasonal storage of heat in the surface layer of the earth. South Africa. Weather Bureau, Notes*, 2(1/2):4-19, 1953. 2 figs., 10 tab. bibliog. p. 16-19, 38. DWB—The seasonal storage of heat in the upper layers (liquid or solid) of the earth which must be considered in the differential equation describing the transfer of heat from the equator to the poles, necessitates the introduction of the quantities, heat storage capacity and actual seasonal heat storage in the surface layers expressed as a fraction of maximum heat that can be stored under optimum conditions. For determining the average values of M and F for the earth as a whole the equation of heat transfer is derived for a medium whose density, specific heat, thermal conductivity and coefficient of radiation transmission are known constants. It is shown theoretically that the heat storage capacity of the ocean is largely due to the transparency of water to radiation and can be explained without considering the convective transfer of heat at all. Experimental values of F and M for water and land surfaces (for all the continents and for various types of surfaces) were determined and given in tables. Average values for M for land and water surface are 71 and 2520 calories per degree centigrade so that average value of M for the earth's surface is 1810 calories per degree centigrade since these surfaces are in the ratio 29 to 71. The magnitude of F is approximately 10% for the earth surface and between 80-90% for the water surface. A special bibliography on this subject is appended. *Subject Headings: 1. Thermal conductivity 2. Thermodynamics of the atmosphere.*—I.L.D.

5.7-11

551.513.2:551.1

*§Serebreny, Sidney M. and Wiegman, Eldon J., *Characteristic properties of the jet stream over the Pacific, Case history No. 1, Pt. 1.* Pan American World Airways, Inc. Pacific-Alaska Div. Meteorology Dept., Contract N189s-90981, Technical Report, No. 1, Nov. 1953. 151+112 figs. (some fold.), 14 refs. DWB—Aircraft reports during 6 planned up to 25,000 ft. height flights through the jet stream and synoptic data for Feb. 7-15, 1953 were used to make a thorough analysis of the jet stream structure over the western North Pacific. Nine case histories are presented with all of the necessary surface and upper level 500 mb, 400 mb thermal charts, cross sections, etc. The summary involves suggestions for forecasting (location, orientation, vertical structure, speed, direction, turbulence and accompanying route) weather conditions for each case. It was found that the jet stream lies along the Pacific Front, is embedded in the warm air in region where the temperature gradient is strongest. Winds over 290 knots were observed at the 40,000 ft level. Frequency of jets of various widths at different longitudes are tabulated for the 500 mb and 400 mb level showing that the largest proportion of the jets are 5° wide. Detailed analysis of wind maximum over Japan indicates that there are multiple jets there which, however, merge downstream. Average width is 250 and 400 miles at 500 and 400 mb levels. Hints for chart analysis of jet stream conditions are given, with emphasis on non-uniform spacing of isotherms (close packing) in vicinity of jet stream. *Subject Headings: 1. Jet stream structure 2. Pacific jet stream 3. Synoptic*

erological studies. I. Pan American World Airways, Inc., Pacific-Alaska Div., Meteorology Dept. II. Contract N189s-90981.—M.R.

5.7-12

551.509.31:551.547.1:016

†Stephens, F. Briscoe; Moyer, Vance; Taylor, Charles L. and Jones, David L., **A summary and evaluation of the various existing methods and techniques employed in forecasting the heights of constant pressure surfaces.** Pennsylvania. State College. Mineral Industries Experiment Station, Contract N189s-80323, Final Report, Dec. 31, 1951. 28 figs., 5 tables, 44 refs. 2 v. v. 1, Text; v. 2, Bibliography and Abstracts. **DLC**—Over 300 articles which are in one way or another pertinent to the subject of forecasting the heights of constant pressure surfaces, or the analysis which precedes the forecasting, were abstracted—some at great length. These are arranged in a random order, but an alphabetical bibliography arranged by author (title and reference only) serves as an author index. The various "schools" represented in the bibliography are evaluated and discussed. Conclusion is that no one method is completely objective or can be recommended over other methods. The subjects are: choice of levels, forecast period, diurnal changes in height of constant pressure surfaces (over North America), convergence and vertical motion, long and short waves, vorticity theory and trajectories (ROSSBY, FULTZ, BORTMAN, WOBUS, NAMIAS and CLAPP), thickness based on advection, Charney-Eliassen forecasting by numerical methods, etc. The empirical rules derived from each of the above are summarized at the end of each chapter and charts, graphs, references, etc. amply included. The role of experience is constantly emphasized in the text. (Same item as 5F-46, June 1954, MAB.) **Subject Headings:** 1. Constant pressure surface forecasts 2. Synoptic analysis 3. Forecasting bibliographies. I. Pennsylvania. State College. Mineral industries Experiment Station II. Contract N 189s-80323 III. Project AROWA (TED-UNL-MA 501).—M.R.

5.7-13

535.24(02)

†Walsh, John William Tudor (*Int. Commission on Illumination*), **Photometry.** London, Constable, 1953. 2d ed. rev. 544 p. 281 figs., extensive bibliographies throughout. **DWB**—The second edition of this text (first published in 1925) has at last 2/3 of its contents revised and several new chapters added. Each chapter has an extensive list of references, completely revised so that most of the post-1925 material is included and only a selection of the best pre-1925 material remains. The photoelectric cell is the most prominent milestone in photometry, and its use has seeped into every chapter and in addition it occupies a separate chapter. The titles of the chapters, alone, suggest the applicability to modern physical meteorology in its many aspects: 1) history of photometry since 1725, 2) radiation (theory and practice), 3) the eye and vision, 4) photo-electric cells, 5) principles of photometry, 6) standards, 7) measurement of luminous intensity, 8) light distribution and flux measurement, 9) heterochromatic photometry, 10) colorimetry, 11) spectrophotometry, 12) illumination and luminance, 13) measurement of reflection, transmission and absorption factors, 14) photometry of projection apparatus, 15) stellar photometry, 16) the photometric laboratory. The appendices contain 1) a list of 28 books on photometry from BOUGNER's (1729) and LAMBERT's treatises (1760) to COHN's (1949) text on radiation and photometry. Appendix 2 contains symbols and definitions of 77 photometric quantities. Appendix 3, conversion factors and appendices 4-10 various calculation tables and specifications, each with a number of references to sources. **Subject Headings:** 1. Photometry 2. Photometry bibliographies 3. Textbooks 4. Conversion tables 5. Definitions.—M.R.

5.7-14

551.583:551.4(263)

†Wiseman, J. D. H., **The determination and significance of past temperature changes in the upper layer of the equatorial Atlantic Ocean.** *Royal Society of London, Proceedings, Ser. A*, 222(1150):296-323, March 18, 1954. 3 figs., 5 tables, 77 refs., 9 eqs. **DWB**—The variations of temperature are calculated from the CO₂ content of samples drawn from a foraminiferous core, assuming that rate of sedimentation of non-calcareous elements has remained constant. Results show a long period change on which minor oscillations are superposed. The long period minima (low temperatures) occur (in 10³ years ago): 12, 25, 70, 119, 187, 246, 336, 419, 546, 621. This agrees approximately with average for Pacific cores. Details of short

period variations are given about 15,000 B.C. to A.D. 1838, supported by amounts of Ti and Fe. Maxima of CO₂ (cool periods) are dated A.D. 1200, 500, 100 and 550, 1100, 1600, 1950, 2500 B.C., in general agreement with recurrence surfaces in peat bogs. *Subject Headings*: 1. Climatic changes 2. Equatorial Atlantic.—*C.E.P.B.*

5.7-15

551.571:551.579.5:631.5

Witte, Karl, *Untersuchungen über den Einfluss erhöhter Luft- und Bodenfeuchte auf den Pflanzenertrag*. [Investigations on the influence of increased air and soil moisture on plant yield.] Hamburg, Verlag Wasser u. Boden, 1952. 38 figs., 41 tables, 39 refs. GB-MO—This little book describes experiments at the agricultural research station at Marhof near Bonn. The first chapters deal with field work in 1949 and 1950. The effect of spraying on temperature and humidity was examined. Night spraying watered the soil more effectively than day spraying, and caused a smaller fall of temperature (1°C against 2.3°C). The remaining chapters describe greenhouse investigations. Saturated air is good for water-loving plants but not for others; high temperature is still more effective. *Subject Headings*: 1. Water 2. Crop yield 3. Soil moisture.—*C.E.P.B.*

GENERAL METEOROLOGY

5.7-16

551.5(0)

Yugoslavia. Hidrometeorološka Služba, *Vesnik*. First issue recd. Vol. 1, No. 3, July/Oct. 1952; latest recd. Vol. 2, No. 3, July/Sept. 1953. Quarterly (irreg.). Editor: I. Marjan Čadež. In Serbocroatian (Latin alphabet throughout). DWB—Each issue contains: a) papers (mostly popular explanations of miscellaneous meteorological information or discussions of latest developments in methods and instrumentation in Yugoslavia and abroad); b) weather summary (including data for past months and discussion of climatic features); c) short notes (news from home and abroad), d) obituaries and e) accounts of scientific meetings and activities. *Subject Headings*: 1. Periodicals 2. Serbocroatian language 3. Yugoslavia. I. Čadež, Marjan (ed.).—*G.T.*

5.7-17

551.5:06(0)

Pavišić, Antun and Makjanić, Berislav, *Meteorologija, Dio I. Atmosfera, njene fizikalne karakteristike i fizikalni procesi u njoj*. [Meteorology Part. I. Atmosphere, its physical characteristics and physical processes.] Split, Yugoslavia. Hidrografski Institut Jugoslovenske Ratne Mornarice, Meteoroloski Otsjek, 1947. 303 p. 131 figs., tables. DWB—A nicely bound and edited textbook designed for use in the Yugoslav Meteorological Service. The service in Yugoslavia, networks, stations, etc. are first described. Structure and composition of the atmosphere, general circulation, turbulence and winds, energy exchange in the atmosphere, temperature, moisture exchange, fog, visibility, weather, pressure, geographical variations in weather, optical, acoustical and electrical phenomena, etc. and applications are treated. Examples and cloud photos are from Yugoslavian sources. *Subject Headings*: 1. Meteorological textbooks 2. Yugoslavian meteorological service 3. Textbooks.—*M.R.*

5.7-18

551.5:358.

William-Olsson, Martin, *Orientering om meteorolog-tjänsten vid kustartilleriet*. [Information on the meteorological service of the coast artillery.] *Tidskrift för Kustartilleriet*, Stockholm, 3(1):15-25, 1945. DLC—General information on tasks, methods, instrumentation and significance of the special meteorological service for artillery. The forecasts worked by the MV (military weather service) should be used only as a basis for observations taken by the special weather service. In peace time, during maneuvers, artillery-meteorological observations are made two times a day and in war at least four times or whenever necessary for exact local artillery fire. *Subject Heading*: 1. Military meteorology.—*W.N.*

5.7-19

551.5:355.32(4)

Meteorology in the Royal Navy. *Marine Observer*, 23(159):19-22, Jan. 1953. MH-BL—A historical account of the development of naval meteorology in Britain and activities of the Naval Weather Service. *Subject Headings*: 1. Marine meteorology 2. Great Britain. Naval Weather Service.—*C.E.P.B.*

5.7-20

551.5:37

Beck, Niels C., **Foreword to career and education issues.** *Weatherwise*, 6(5):116-117, Oct. 1953. **MH-BH**—This issue of the *Weatherwise* contains 6 articles on various aspects of educational opportunities and careers open to meteorologists in government, military and industrial fields, as well as a list of recent texts and periodicals in the English language which could be used by students and teachers. In the foreword, NIELS C. BECK, Chairman of the A.M.S. Advisory Committee on Education, gives the background of this issue which supplements the A.M.S. publication *Weather Horizon* (1947). Articles are abstracted separately. **Subject Headings:** 1. Careers in meteorology 2. Teaching of meteorology.—*M.R.*

5.7-21

551.5:37

Meteorological education in the United States. *Weatherwise*, 6(5):126-142, 150, Oct. 1953. **illus. MH-BH**—Facilities for teaching, research and study of meteorology and contract activities at each of the twenty leading universities in the U. S. are described in considerable detail. These are: Univ. of California at Los Angeles, Davis and Berkeley and Scripps Institute of Oceanography; Univ. of Chicago, Florida State Univ.; Iowa State College (Ames), Johns Hopkins, M.I.T.—the first to establish a Department of Meteorology (1928), Univ. of N. Mex., New York Univ., Ohio State Univ., Oklahoma A. and M., Oregon State College, Pennsylvania State College, Rutgers Univ., Saint Louis Univ. Institute of Tech., Parks College of Aeron. Tech., Texas A. and M., Univ. of Texas, Univ. of Utah, Univ. of Washington and Univ. of Wisconsin. **Subject Headings:** 1. Teaching of meteorology 2. Meteorological research 3. United States.—*M.R.*

5.7-22

551.5:37 551.509.2/3

Neiburger, Morris (*Univ. of Calif., L. A., Dept. of Met.*), **The place of synoptic meteorology in the university curriculum.** *American Meteorological Society, Bulletin*, 34(8):351-354, Oct. 1953. 2 refs. **MH-BH**—The author analyzes the subject matter of synoptic meteorology as revealed by the topics covered in a course in synoptic meteorology and its relationship to that of dynamic meteorology. In relation to the problem of whether synoptic meteorology should be taught systematically on a university level, the author points out that a program of synoptic lectures and laboratory would provide the student with the descriptive aspects of atmospheric structure and behavior with respect to flow patterns and weather phenomena, with explanations of weather phenomena in terms of basic physical laws, with an understanding of present methods of weather forecasting and with experience in observing and recording natural phenomena. **Subject Headings:** 1. Teaching of meteorology 2. Meteorological curricula 3. Synoptic meteorology.—*I.L.D.*

5.7-23

551.5:37

Sauberer, F., **Die Wetterkunde im türkischen Volksschulunterricht.** [Meteorology as taught in Turkish public schools.] *Wetter und Leben*, 5(3/4):85-86, May 1953. **MH-BH**—The names of the individuals responsible for introducing the teaching of meteorology in the Turkish elementary schools are listed. It began in 1936. The various stages of familiarizing the pupil with observing and recording data are described. **Subject Headings:** 1. Teaching of meteorology 2. Turkey.—*I.L.D.*

5.7-24

551.5:37

†Voigts, Heinrich, **Die Meteorologie in den Physik- und Erdkundelehrbüchern für die Höheren Schulen.** [Meteorology in physics and geography textbooks for higher schools.] *Meteorologische Rundschau*, 5(5/6):107-108, May/June, 1952. **table. MH-BH**—Continuation of article in *Ibid.*, 5(3-4):63-65 (see item 3.11-24, Nov. 1952, *MAB*). **Subject Heading:** 1. Teaching of meteorology.—*C.E.P.B.*

5.7-25

551.5:373

Voigts, Heinrich, **Der wetterkundliche Unterricht an Höheren Schulen.** [Meteorological teaching in higher schools.] *Annalen der Meteorologie*, 5(7/12):382-387, 1952. **fig.**, 3 tables, 3 refs. Discussion p. 386-387. **MH-BH**—The status of meteorology in teaching or examination of physics or geography in various German states is summarized; in many there is none.

Methods of teaching phenology as part of climatology are described. *Subject Headings*

1. Teaching of meteorology.—*C.E.P.B.*

5.7-26

551.5:378:355.7

Sverdrup, Harald Ulrik, *Krigs- og Forsvarsforskning i De Forente Stater*. [War and defense research in the United States.] *Norsk Militær Tidsskrift*, 119(7):321-337, 1944. ref. **DLC**—Mention of training of 9000 military forecasters at MIT, Chicago and Cal. Tech and problems of academic freedom. American science is said to have caught up with Germany. *Subject Headings*: 1. Training in meteorology 2. Military forecasters.—*M.R.*

5.7-27

551.5:5

Wright, Wilfred Laurier, *Principia and equations of pandectic meteorology*. Los Angeles Calif., Pacific Polytechnic Press, 1953. 52 p. refs., 16 eqs. **DWB**—Terrestrial meteorology is a particular case of the pandectic meteorology, that is the general theory of the atmosphere including astronomical applications. The author bitterly attacks the classical theory of the sufficient velocity of escape and defends his own work on astronomic meteorology (1951) in a verbose and sarcastic manner. The theoretical ratio between the earth's radius and the height of its stable atmosphere (H) should be 2π that is $H=1,014$ km, which is exactly the maximum measured height of a "sun-light" aurora (1923). A set of rather simple equations is added, giving for celestial bodies the relations between mass, density and dimensions of the containing body and its atmospheres, as well as between surface gravity and atmospheric pressure. *Subject Headings*: 1. Astronomic meteorology 2. Height of the atmosphere 3. Auroral heights.—*A.A.*

5.7-28

551.5:63(0

†Schnelle, Fritz, *Einführung in die Probleme der Agrarmeteorologie*. [Introduction to the problems of agricultural meteorology.] Stuttgart, Eugen Ulmer, 1948. 154 p. 23 figs. biblog. p. 144-149. *Schriften über neuzeitlichen Landbau*, Stuttgart, No. 11. **DLC**—This book presents a discussion of the rôle of meteorology in agriculture and the utilization of meteorological principles (both micro- and macroclimatic) to increase agricultural productivity. The following aspects of agricultural meteorology are considered: a brief historical sketch of the development of agricultural meteorology, in particular in Germany; macroclimate, microclimate and soil climate as factors of production in agriculture; the relation between climate and soil functions and erosion; soil cultivation and cover, and fertilization; climate and plant development (germination, vernalization, photoperiodicity, vegetation period, harvesting and storage); weather injuries such as frost damage, storm and smoke damage; the relationships between climate and plant and animal diseases; artificial climate and plants; climate and plant breeding; animal climatology including animal husbandry, stable climate; forecasting and agriculture, agricultural meteorological forecasting and advising; climate and agricultural policy, etc. The book contains a very good bibliography. *Subject Headings*: 1. Agricultural meteorology 2. History of agricultural meteorology.—*I.L.D.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

5.7-29

551.501:

Burgess, Cecil Ritchie, *Weather observation in secondary schools*. *Weather*, 8(2):45-48, Feb. 1953. **MH-BH**—Account of a vacation course for teachers at Dartford College, Aug. 1952. *Subject Heading*: 1. Teaching of meteorology.—*C.E.P.B.*

5.7-30

551.501:664

Curry, William, *Take a look at the weather*. Many times it calls the tune on the production line. *Canco*, N. Y., 10(3):2-5, March 1952. illus. **DWB**—Illustrated report by Bill Curry's, Canco Sales Division Manager, visit to the U. S. Weather Bureau scenes of activity at the Chicago Weather Bureau Forecast Center and the Joliet, Illinois, Aerological Station. Radiosonde and rawinsonde procedure, map analysis, teletype communication, facsimile map

transmission, telephone and radio weather broadcasts and other activities of these busy centers are illustrated. The effects of weather on the can industry are briefly discussed. *Subject Headings*: 1. Observation techniques 2. Synoptic analysis 3. U. S. Weather Bureau 4. Industrial meteorology.—G.T.

5.7-31

551.501.1:551.508.822

Ewing, R. A., **A comparison of instruments used in New Zealand for upper air soundings.** *New Zealand. Meteorological Office, Circular Note*, No. 73, May 29, 1951. 4 p. 4 tables. **DWB**—Comparisons made in New Zealand with the United States Diamond-Hinman and the British Kew radiosondes are discussed. Details are also given of upper wind measurements made with the New Zealand ME. 7 radar and the British A.A. No. 3 MK.2/4. *Subject Headings*: 1. Instrument comparisons 2. Radiosondes.—*Author's abstract*.

5.7-32

551.501:551.547.2

Duthie, William Dwight and Haltiner, G. J. (both of U. S. Naval Postgraduate Sch. Monterey, Calif.), **Techniques for estimating the heights of constant pressure surfaces.** (In: J. S. Navy. Fleet Weather Central, *Some recent developments in synoptic meteorology*. Aug. 1952. Section 5. 9 p. 4 plates, 3 tables.) **DWB**—The pastagram of J. C. BELLAMY and its use are thoroughly described and illustrated. Pressure-height determinations are reviewed and a method for checking or extrapolating height in the troposphere outlined and illustrated. Conversion of D value reports to pressure values and necessary computed tables and diagrams are appended. Methods and charts are derived from work of BELLAMY. *Subject Headings*: 1. Pastagrams 2. Pressure height calculation 3. Nomograms. I. Bellamy, J. C.—M.R.

5.7-33

551.501:551.578.46

Fuchs, Alfred, **Räumliche Abbildungen von Schneegefügen als Dauerpräparate.** [Permanent models of snow structure.] *Zeitschrift für Gletscherkunde und Glazialgeologie*, 2(2):299-301, 1953. 4 photos, 8 refs. **MH-BH**—Describes a method of coating snow cores with a permanent very thin opaque coating (solution of plexiglass in ethyl chloride best). Photos of such preparations are shown. *Subject Heading*: 1. Snow investigation.—C.E.P.B.

5.7-34

551.501:551.596.1

Gandin, L. S., **Prilozhenie teorii trekhbazisnykh nabliudenii k zadache artilleriiskoi zvukovoi razvedki.** [Application of theory of observations from three points to the problem of acoustical artillery reconnaissance.] *U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby, Trudy Nauchno-issledovatel'skikh Uchrezhdenii*, Ser. 1, *Meteorologiya*, No. 34:25-33, 1946. 5 figs., table, 5 refs., 7 eqs. **DLC**—The conditions for more effective construction of nonalignment triangles are analyzed and the dependence of the accuracy on distance, length of base and other factors are discussed. *Subject Headings*: 1. Triangulation 2. Acoustical propagation 3. Military meteorology.—N.T.Z.

5.7-35

551.501.45:551.571

Ungeheuer, H., **Erfahrungen mit dem Sättigungsgrad.** [Experiments with the degree of saturation.] *Meteorologische Rundschau*, 7(1/2):16-19, Jan./Feb. 1954. 4 figs., 3 tables, 7 refs. **DWB**—Long period monthly means $e_m = a + t_m^2$. Wet bulb means t_m' plotted against t_m give straight line $t_m' = R t_m + a$. At different stations R varies from 0.67 to 0.94 and a from -4.3 (Khartum) to +10.8 (Batavia) but is mostly near -1.0. Relations to degree of saturation are discussed, including use of e/E' , where E' is saturation vapor pressure at t' , as a measure of relative humidity. *Subject Headings*: 1. Methods of computation 2. Vapor pressure.—C.E.P.B.

OBSERVATIONAL DATA

See also: Unusual winter weather over S. Africa, July 1952 (Le Roux, Taljaard), 5.7-54.

5.7-36

551.506.1(05,866)

*Ecuador. Armada. Sección Meteorológica Marítima, **Boletín Meteorológico de la Armada.** [Meteorological Bulletin of the Navy.] First issue recd., No. 1, [1951?]; latest

issue recd., No. 2, 1953. unpagcd. all tables and graphs. DWB—Standard tables of monthly and annual mean and extreme temperature, humidity, vapor pressure, precipitation wind, clouds and hydrometeors for Ecuador, coastal and island stations of Guayaquil, Esmeraldas, Manta, Puna and Galápagos for 1949 and 1950, including nicely constructed and reproduced graphs of the principal elements, are presented in the first issue. The second issue contains similar data for 1951 and 1952 for the above stations and in addition for Salinas, Puerto Bolivar and San Cristobal. Four charts show mean seasonal values of pressure, relative humidity, wind, air and sea temperature from observations made on naval vessels operating between coastal stations of Ecuador and the Galápagos, and along the coasts of both areas. *Subject Headings:* 1. Serial publications 2. Monthly climatic data 3. Annual meteorological reports 4. Marine climatic data 5. Ecuador 6. Galápagos Islands.—*M.R.*

5.7-37

551.506.5(988)

*Carles, L. M., *Climatologie de l'inlandsis Groenlandais*. [Climatology of Greenland Ice Cap.] *Presse Thermale et Climatique*, Paris, No. 3/4, March/April 1953. 14 p. Abstracted from reprint. At head of t-p: Expéditions Polaires Françaises (Missions P.E. Victor). DSG—A popular article summarizing the meteorological observations made during the first winter (1949-1950) by the Paul-Émile Victor Expedition, on the Greenland Ice Cap, at the station 70°54'N lat. and 40°26'W long, 3000 m above sea level. Data are given on diurnal temperature range, characteristics of storms and weather types, light intensity, atmospheric electricity, aurora borealis, etc. *Subject Headings:* 1. Expeditionary data 2. Greenland Ice Cap.—*I.L.L.*

5.7-38

551.506.6

Lessmann, Helmut, *Phänologie und Witterung in den Jahren 1947 bis 1951 in der südlichen Oberrheinebene*. [Phenology and weather conditions during 1947-1951 in the southern Upper Rhine Plain.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen, 1951/1952*, p. 144-150. 3 figs., 8 refs. DWB—Duration of characteristic phases of the vegetation season is studied by means of guide plants and compared with the transition through 5, 10 and 15°C. The interruption of the blossoming of fruit trees due to cold spells is shown. Mesoclimatic differences are discussed. *Subject Headings:* 1. Phenology 2. Upper Rhine, Germany.—*A.A.*

5.7-39

551.506.8:551.524

Lessmann, H., *Über Temperatursummen*. [Cumulative temperatures.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen, 1951/1952*, p. 134-143. 3 figs., 3 tables. DWB—The method of characterizing the ecological climate by cumulative temperatures illustrated by the totals of hourly temperatures below 0 and over 0.5 and 10°C for the station Munzingen-Mengen and Baldenweger Hof, both near Freiburg, covering the year 1951 and partly Jan.-March 1947-51. *Subject Headings:* 1. Degree days 2. Phenology 3. Freiburg, Germany.—*A.A.*

INSTRUMENT CARRIERS

See also: Instrumentation phase of extreme UV research (Colorado Univ.), 5.7-98.

5.7-40

551.507.321

Dines, J. S. and Ludlam, F. H., *Rate of rise of pilot balloons*. *Meteorological Magazine*, London, 83(981):80-91, March 1954. MH-BH—J. S. DINES comments on paper by F. LUDLAM (*Meteor. Magazine*, 82(976):306-308, Oct. 1953, see 5.2-48 in May 1951, *MAA*). *Subject Headings:* 1. Balloon research 2. Balloon ascension rates.—*C.E.P.B.*

5.7-41

551.507.362:621.3

*Low, Ward C. and Knight, Raymond M., *Rocket reception of radio pulses over long distances*. Boston University. Upper Atmosphere Research Laboratory, Contract 19(122)-36, Investigation of the ionosphere utilizing sounding rockets, Final Report, June 1953. 65 p. tables, numerous figs. MH-BH—This is the final report on Contract 19(122)-36 between the Department of Defense and the Trustees of Boston University. also marks the conclusion of the project usually termed the "Oblique Incidence Ionosphere Experiment," here called briefly the "Ionosphere Experiment." The principal goal of the

project has been to obtain general information concerning characteristics of long distance radio pulse reception in high altitude rockets, more specifically, whether significant deviations from results of simple propagation theory result from the receiving stations being in, or very near, the E-layer. To the limited extent to which the recovered data have been examined, no such anomalies have been recognized. A description of the equipment employed on this experiment on three high altitude missiles: V-2 No. 51, and AFCRC Aerobee Rounds No. 20 and No. 24 is presented. A display of data obtained during the flights of those missiles is given, with a discussion of the methods of measurement used. *Subject Headings:* 1. Rocket observation data 2. Radio reception by rockets 3. Rocket instrumentation 4. Ionospheric soundings. I. Boston Univ. Upper Atmosphere Research Laboratory II. Contract AF 19(122)-36.—*Author's abstract.*

INSTRUMENTS

See also: Instrument technology (Jones), 5.7-6; Comparison of instruments used in New Zealand for upper air soundings (Ewing), 5.7-31.

5.7-42

551.508

Novikov, A. I., *Meteorologicheskies pribory. Remont i regulirovka.* [Meteorological instruments. Repair and calibration.] 2nd rev. ed. Leningrad, 1952. 105 p. 58 diags., tables, 8 refs. **DLC**—This instrument maintenance manual is limited to pressure, temperature and humidity instruments. Detailed instructions are given for station control, inspection and expedition barometers, mercury manometer, the cleaning and distillation of mercury air suction pumps, stationary aneroid and height barometers, barograph and hypsometer, thermometer and thermograph, aspiration psychrometer, hair hygrometer, hygrograph and the clock mechanism of automatic recorders. A detailed list of thermometers and barometers used in the Soviet Union is given on pp. 98-100 and a list of control and repair stations on pp. 105-106. *Subject Headings:* 1. Meteorological instruments 2. Instrument maintenance 3. Instrument manuals 4. U.S.S.R.—A.A.A.

5.7-43

551.508.25:551.508.71

Foskett, Laurence W.; Foster, Norman B.; Thickstun, William R. and Wood, Rex C. *Instrument Div., U. S. W. B.), Infrared absorption hygrometer. Monthly Weather Review*, 81(9):267-277, Sept. 1953. 8 figs., 10 refs. **MH-BH**—A recording infrared absorption hygrometer which measures the absolute humidity in 1-meter light path is described. Record is obtained on a remote self-balancing potentiometer. Use is made of the 1.37μ water vapor absorption band and a 1.24μ reference band. Isolation is by means of transmission type interference band-pass light filters. Infrared detection is by means of a lead sulfide photocell and amplifier. Isolation filters are contained on a sector wheel which is rotated to chop an infrared beam. A self-balancing null system is employed whereby the energy in the absorption band is kept equal to the energy in the reference band at all times. Balance is maintained by automatically varying the temperature of the lamp supplying the infrared energy, and the temperature of the lamp is a measure of the water vapor in the sensing path. An index of the lamp temperature is obtained by means of a monitor photocell, and meter or recorder. Included is a discussion on the calibration and field tests made on the instrument at the Weather Bureau Laboratories, Washington, D. C. *Subject Headings:* 1. Infrared absorption hygrometers 2. Infrared filters.—*Authors' abstract.*

5.7-44

551.508.25

Skeib, Günter, *Ein rotierender Strahlungsumsatzmesser mit induktiver Übertragung der Messspannung.* [A rotating radiation balance meter with inductive transfer of measurement voltage.] *Zeitschrift für Meteorologie*, 7(6):167-171, June 1953. 6 figs., 6 refs. **MH-BH**—The theoretical basis underlying the construction of a meteorological radiation balance meter is presented and the design of the apparatus is described with the aid of diagrams and photographs. The precision of this instrument is enhanced in that the influence of the wind upon the measuring units is eliminated by rapid rotation of the measuring plate system, the measuring voltage is transmitted inductively from the rotating plate system from a low resistance primary spool system and a high resistance secondary spool system; the measuring

voltage is intensified by a low frequency amplifier and it is connected to a recording device.
Subject Heading: 1. Radiation balance meters.—I.L.D.

5.7-45

551.508

*Sogin, Harold H. **Research studies toward development of a working model of a surface hypsometer.** Illinois Institute of Technology, Contract DA-36-039-sc-15559, Final Report, Aug. 1, 1952-Jan. 31, 1953. 37 p. 5 figs., 7 tables, 5 refs., eqs. DWB—Apparatus, instrumentation, experimentation to check a model hypsometer are described. The hypsometer temperatures were measured with a platinum resistance thermometer and a Mueller bridge. The temperatures were converted to pressures using well established relationships for saturated steam in the literature. At atmospheric pressure the hypsometer readings were checked against those of a barometer. Pressures between 550 and 1050 mb (millibars) were compared with readings of a mercury manometer which gave absolute pressures. Results indicate that at ordinary atmospheric pressure the hypsometer readings are reproducible within 0.1 mb and that at other pressures they deviate somewhat more. **Subject Headings:** 1. Hypsometers 2. Instrument comparisons. I. Illinois Institute of Technology II. Contract DA-36-039-sc-15559.—*Author's abstract.*

5.7-46

551.508

Wind-direction recorder. *Meteorological Magazine*, London, 83(979):11-14, Jan. 1951. 5 figs. MH-BH—Describes a direction recorder, designed and made at the Tropical Test Station, Port Harcourt, Nigeria, with one pen actuated by a single cam, recording over 360° and reversing over 90°. Amplitude is damped by a splayed vane. Diagrams, photographs of specimen records shown. **Subject Heading:** 1. Wind recorders. I. Nigeria. Tropical Test Station. —C.E.P.B.

5.7-47

551.508.5:551.5

Bass, J. **Quelques nouveaux appareils de mesure de la turbulence en soufflerie ou en atmosphère.** [Some new devices to measure turbulence in a wind tunnel or in the atmosphere.] *France. Ministère de l'Air, Publications Scientifiques et Techniques*, No. 251:311-315, 1951. 3 figs. DWB—An integrating recorder for 2 anemometers enables one to register simultaneously the output and hence the correlation between the wind speeds at 2 points, even to register triple correlations. A revolving magnetic band serves as the recorder tape. The equipment which is illustrated and described is in use at the Laboratory of Atmospheric Mechanics at the Institute of Fluid Mechanics in Marseilles, and was devised by M. Fauriol. A hot wire anemometer in use at the Institute of Fluid Mechanics in Paris is also described. **Subject Headings:** 1. Wind speed recorders 2. Turbulence recorders 3. Hot wire anemometers.—M.R.

5.7-48

551.508

Cicala, Aldo. **Anemometro meccanico integratore.** [Mechanical integrating anemometer.] *Rivista di Meteorologia Aeronautica*, Rome, 13(23):48-51, April-Sept. 1953. 5 figs. Italian, French, English and German summaries p. 48. MH-BH—A modification of a mechanical integrating anemometer (which permits one to instantly determine the wind speed or the mean wind speed for the time it takes for 2 miles of wind to pass) is described and illustrated. The new instrument allows one to quickly determine (in knots or m/sec) the total mean wind from each of the 8 standard points of the compass. The relays and integrator are illustrated in detail. **Subject Headings:** 1. Integrating anemometers 2. Recording anemometers.—M.R.

5.7-49

551.508.59:551.5

De Pasquale, Oreste. **Ricerche sperimentali sulla turbolenza atmosferica registrata dalla turbolenza (turbografo) a tubisonda.** [Experimental research on atmospheric turbulence. Sonde-tube turbulence recorder (turbograph).] *Rivista di Meteorologia Aeronautica*, Rome, 13(23):42-47, April-Sept. 1953. 5 figs. Italian, French, English and German summaries p. 42. MH-BH—A self-recording anemometer of very high degree of sensitivity and designed for turbulence investigations is described and illustrated (including recording).

records and telemetering device). The equipment consists of a very simple piezometric device and a self-recording hydro-pneumatic capsule. It is installed at the Messina Experimental Meteorological Observatory. *Subject Headings:* 1. Turbulence measurement 2. Recording instruments 3. Messina Observatory, Italy.—M.R.

5.7-50

551.508.92

Pearson, C. A., (Naval Research Laboratory, Wash., D. C.), A recording atmospheric transmissometer. U. S. Naval Research Laboratory, Report 3949, March 7, 1952. 13 p. 2 figs., 2 tables, 5 refs. DWB—Transmission of light over a two-mile path was measured during twelve nights. A photoelectric telephotometer with RCA 5819 multiplier phototube was used in conjunction with an Esterline Angus recorder. This transmissometer was fitted so as to correspond to the sensitivity of the human eye as shown by comparative data on results obtained through visual and photoelectric methods presented in a table. The apparatus is described in detail and shown in several photos and diagrams. Transmissometer records are reproduced. Details on calibration, operation, measurement, and analysis are given and the precision of the instrument discussed. *Subject Headings:* 1. Transmissometers 2. Visibility meters.—G.T.

5.7-51

551.508.93:551.593.55

Link, F., Sur la possibilité des sondages optiques de la haute atmosphère à l'aide des phénomènes crépusculaires. [On the possibility of optical soundings in the upper atmosphere by the aid of crepuscular phenomena.] I.U.G.G. Association of Terrestrial Magnetism and Electricity, IATME Bulletin, No. 13:504-506, 1950. 2 figs., table, 8 refs. DWB—Objections to optical sounding methods during twilight on the grounds of secondary and higher order scattering errors can be avoided if the work is done with measurements toward the infrared (8000 Å). Curves are given for log of brilliance b at different angles up to $U=12^\circ$ or $H=140$ km and a table giving: $-\log \rho$ (density) for $h=50, 60, 70 \dots 180$ km. *Subject Headings:* 1. Optical soundings 2. Twilight phenomena 3. Zenith twilight 4. Upper atmosphere density.—M.R.

SYNOPTIC ANALYSIS AND FORECASTING

See also: Evaluation of methods and techniques in forecasting heights of constant pressure surfaces (Stephens, others), 5.7-12; Synoptic met. in university curriculum (Neiburger), 5.7-22.

5.7-52

551.509.31:551.515.11

Jones, Alan H. and Roe, Charlotte L. (U. S. W. B.), The Northern Gulf LOW of February 4, 1953. Monthly Weather Review, 81(1):47-52, Feb. 1953. 11 figs., 3 refs. DWB—A detailed synoptic analysis of an unusually fast moving low which developed over Texas and moved across the Northern Gulf to North Florida and Georgia between Feb. 14 and 15, causing thunderstorms, rain, floods and strong gusty winds over a large area bordering on the Gulf. The antecedents are traced by means of a composite trough and ridge movement chart for period Feb. 12-15, showing a retrograde trough, followed by a cold low which moved down from Washington State to Arizona and Texas and as a fast moving trough out over the Gulf. General 500 mb charts and local 850 mb charts are presented in addition to surface and prognostic 500 mb charts. *Subject Headings:* 1. Gulf of Mexico Lows 2. Synoptic studies 3. Cold lows 4. Gulf States.—M.R.

5.7-53

551.509.312:551.515.11

Farquharson, J. S., Vorticity and synoptic development. Great Britain. Meteorological Research Committee, M.R.P. 829, Aug. 6, 1953. 7 p. 4 figs., table, 8 refs., 8 eqs. Mimeo. FB-MO—Difficulties in application of SUTCLIFFE's 1947 ideas are discussed. Relative divergence between pressure levels is important but comparing developments in the thicknesses 1000-700, -500, -300 mb in a deepening depression (Feb. 4, 1951) shows that the area of maximum development varies with thickness of atmosphere considered. The curl term $\left(\frac{\partial V}{\partial p} \cdot \frac{dp}{dt} \right)$ is shown as possibly important for forecasting. SUTCLIFFE's form of the vorticity

equation is evaluated for 950 and 500 mb for Feb. 4, 1951; an area of increasing cyclonic vorticity was followed by development of a small secondary depression. A similar development was found on Oct. 3, 1952. *Subject Headings: 1. Cyclogenesis 2. Vorticity.*—C.E.P.

5.7-54

551.509.31:551.506.9(6)

§Le Roux, J. J. and Taljaard, J. J., **An example of unusual winter weather over South Africa during July 1952.** *South Africa. Weather Bureau, Notes*, 1(2):70-78, 1952. 11 figs. **DWB**—Unusual winter weather caused by southern displacement of the subtropical high pressure belt. Large number of slow moving, dynamic anticyclones passed eastwards south of the Union. Author discusses characteristic weather sequence for 4 days, presenting surface weather maps, rainfall distribution, changes in relative and absolute topography, upper air temperature and winds, and explains the physical processes involved. *Subject Headings: 1. Synoptic studies 2. Weather anomalies 3. South Africa.*—A.A.

5.7-55

551.509.

Ogawara, M., **Methodology of long-range forecasting.** *Journal of Meteorological Research*, Tokyo, 4(7):444-459, Oct. 1952. refs. p. 458-459, 7 eqs. In Japanese; English summary p. (28)-(29). **MH-BH**—The methodology developed in this paper concerns the general theory of forecasting. While being mainly aimed at extended and long-range forecasting it is also applicable to short-range forecasts. The basic line on which the methodology proceeds is: 1) synthesis of physical and statistical method; 2) synthesis of predictors and unification of various prediction methods to an objectively formulated forecasting scheme and 3) probabilistic representation of forecast. *Subject Headings: 1. Long range forecasting 2. Extended forecasting 3. Forecasting techniques.*—From author's abstract.

5.7-56

551.509.312:551.511

§George, C. A. (*Regional Met. Centre, Calcutta*), **Thermal thickness patterns and tropical storms.** *Indian Journal of Meteorology and Geophysics*, 4(4):279-290, Oct. 1953. 16 figs., 17 refs. **MH-BH**—In this paper an attempt is made to illustrate the utility of the thermal thickness patterns on constant pressure charts for forecasting the life cycles of a few tropical storms in the Bay of Bengal. The thickness patterns and the contour-thickness relationships seen on the 500-mb isobaric surface gave useful advance indications about the future movement and intensification or decay of the storms under study, at least 12 hours earlier than the evident from the synoptic charts. *Relative divergence* in accordance with SUTCLIFFE's development term was computed from the isopleths of $h_{500} + h_{1000}$ and the total thicknesses at the 500-mb surface and it was found that the patterns so obtained were *qualitatively* in good agreement with the subsequent movement and development of the storms. It is also shown that the storms under study were steered mainly by the thermal winds at 500-mb surface over the western sector rather than by the actual winds at 6 kilometres. *Subject Headings: 1. Tropical weather forecasting 2. Thickness patterns 3. Tropical storms 4. Bay of Bengal.*—Author's abstract.

5.7-57

551.509.33:551.524.33:551.52

Abbot, Charles Greeley (*Res. Assoc., Smithsonian Inst.*), **Long-range effects of the solar variation on the temperature of Washington, D. C.** *Smithsonian Miscellaneous Collections*, 122(1), May 12, 1953. 14 p. 4 figs., 7 tables. *Smithsonian Institution, Publication*, 4131. **DWB**—In continuation of his papers on solar-terrestrial relationships, the author makes an analysis of temperature in Wash., D. C., for the period 1854-1939, based on the assumption of periodicities in solar radiation, submultiple for $22\frac{1}{2}$ years. A synthesis is presented for 1940-52, allowing unpredictable shifts of phases, and a forecast of monthly means up to Dec. 1959. *Subject Headings: 1. Long range forecasting 2. Temperature forecasting 3. Temperature periodicities 4. Solar influences 5. Washington, D. C.*—A.A.

5.7-58

551.509.33:551.524.33:551.577.33(1)

*Abbot, Charles Greeley, **Regarding Washington, D. C., precipitation and temperature 1952 and 1953.** *Smithsonian Miscellaneous Collections*, 121(13), March 3, 1953. 7 p. 2 figs., 4 tables, 2 refs. *Smithsonian Institution, Publication*, No. 4130. **DLC**—Precipitation average for a cycle of 27.0074 days shows "preferred" days within this cycle. Author blames

orean war and atomic bomb tests as a possible cause for the complete failure of a forecast for 1952. A "shift of phases" was also observed for a temperature cycle of 6.6485 days. *Subject Headings: 1. Precipitation cycles 2. Temperature cycles 3. Climatic variations Washington, D. C.—A.A.*

5.7-59

551.509.33:551.577.33:551.521.1

*Abbot, Charles Greeley, *Solar variation and precipitation at Albany, N. Y.* *Smithsonian Miscellaneous Collections*, 121(5), Jan. 27, 1953. 16 p. 6 figs. (some fold.), 3 tables, refs. *Smithsonian Institution, Publication*, No. 4103. **DLC**—Author found that solar radiation varies in 23 periods, aliquot parts of 272 months. "No scientific knowledge of meteorology" would be necessary in order to predict march of precipitation years in advance, combining periods by synthesis. Data for the period 1850-1939 for Albany were used for the analysis. Results obtained by extensive "shifting of phases." Test prediction for 1940-1952 does not show any agreement. *Subject Headings: 1. Precipitation cycles 2. Solar influences 3. Albany, N. Y.—A.A.*

5.7-60

551.509.33:551.521.1:551.577.33

Abbot, Charles Greeley, *Solar variation and precipitation at Peoria, Illinois.* *Smithsonian Miscellaneous Collections*, 117(16), Sept. 3, 1952. 18 p. 7 figs., 5 tables. **MH-BH**—Using 100 months of data (1856-1939) for Peoria, Ill., and tabulating it separately according to 20 or 30 supposed periods, a conclusion is drawn that a number of separate periodicities go to make up the 23-year cycle in rainfall at Peoria. On the basis of these, a 10-year prediction was made, 3 of the years being in advance. It is stated that "99 months out of 136 (1940-1950) show an average divergence of 15%, but the long range prediction is marred by changes of phase which thus far cannot be anticipated and allowed for in advance." The most remarkable correlations are shown in graphs and tables. *Subject Headings: 1. Solar influences 2. Precipitation cycles 3. Periodicities 4. Peoria, Illinois.—M.R.*

5.7-61

551.509.33:551.54

Akedo, K., *Utilization of 5-day mean surface pressure at 40°N and 50°N for one week forecasting (in winter).* *Journal of Meteorological Research*, Tokyo, 4(7):348-350, Oct. 1952. 3 figs. In Japanese; English summary p. (23). **MH-BH**—The author analyzes the 5-day mean pressure over the Northern Hemisphere with the following results: 1) The correlation between the mean pressure over the Northern Hemisphere and that at 40°N or 50°N is larger than at other latitudes. 2) There exists a considerable correlation between the mean pressure at 40 or 50° and the central pressure of the Siberian High. 3) The meridional wave travels from the pole to the equator and vice versa, and it takes 10 to 15 days to travel from 80°N to 40°N or 50°N. This is applicable to one-week forecasting. The relation between mean pressure, temperature and precipitation, and between zonal circulation and meridional circulation is also investigated. *Subject Headings: 1. Extended forecasting 2. Pressure patterns.—Author's abstract.*

5.7-62

551.509.33:551.54

Akedo, K., *Application of the mean pressure values at 40°N and 50°N to extended forecasting in winter.* *Journal of Meteorological Research*, Tokyo, 4(9):582-592, Feb. 1953. 9 figs. In Japanese; English summary p. (37). **MH-BH**—It is well known that the position and intensity of the action center in the Northern Hemisphere vary with the zonal index, which is closely related to the total sum of the air in the Northern Hemisphere. Since it is difficult to forecast directly the total sum of the air, the author assumes in this paper, that the mean pressure values at 40 and 50°N represent the total sum of the air. The results obtained are as follows: A) When the mean pressure values are higher we find 1) north-high south-low pressure pattern, 2) continental high is strong and deviates northward, 3) cyclones tend to pass along the south coast of Japan. B) When mean pressure values are lower we find 1) winter-type pressure pattern, 2) continental high becomes weak and deviates southward, 3) cyclones tend to pass through the Japan Sea. In addition, the relations between zonal circulation and meridional circulation are discussed. *Subject Headings: 1. Extended forecasting 2. Pressure patterns.—Author's abstract.*

5.7-63

551.509.53:551.524.3

*Plaetschke, J., **Taupunkt und Vorhersage der Temperaturminima nach Strahlungsnächten**
Extremer Fall einer hochgelegenen Mulde. [Dew point and the forecasting of minimum
 temperature after radiation nights. Extreme case of a depression of the ground at high
 elevation.] *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 5, Oct. 1953. 18 p. 1
 tables, 2 figs., 22 refs. **DWB**—Dew point is an inadequate means of predicting the extremely
 low temperature minima in the Baar region after strong nocturnal radiation. There is a
 marked daily variation of dew point depending on season and air moisture and apparent
 also on dew formation. Among a number of other methods of forecasting minima, the best
 results are obtained by empirical ones, especially by those making use of wet-bulb temperature.
 These peculiarities may be accounted for by the form and position of the Baar depression, its
 limited night-air outlet and large inlet area. Air imported over the mountain slopes reduced
 moisture and consequently contributes to cooling. *Subject Headings: 1. Minimum temperature
 forecasting 2. Donaueschingen, Baden, Germany.—Author's abstract (trans.).*

5.7-64

551.509.5

Imura, U. and Noda, H., **Rainfall forecasting by pressure difference at Nagoya.** *Journal
 of Meteorological Research*, Tokyo, 4(12):1029-1033, March 1953. 3 figs., table. In Japanese
 English summary p. 62-63. **MH-BH**—Various curves show a close relation of pressure
 differences in different directions from Nagoya or along different meridians, and rainfall at
 Nagoya 24 hours later. *Subject Headings: 1. Rainfall forecasting 2. Nagoya, Japan.—C.E.P.B.*

5.7-65

551.509.5

Jorgensen, Donald L. (*U.S.W.B. Airport Stn., San Bruno, Cal.*), **Estimating precipitation
 at San Francisco from concurrent meteorological variables.** *Monthly Weather Review*, 81(4):
 101-110, April 1953. 9 figs., 2 tables, 7 refs. **MH-BH**. Also in: *Western Snow Conference
 20th, Sacramento, Calif., April 1952, Proceedings*. Discussion by J. Neyman. **DWB**—
 Variables obtained from synoptic sea level and upper air charts are investigated to determine
 their significance in the estimation of concurrent rainfall. Eight variables consisting of sea
 level pressures and pressure gradients, pressure heights and height differences, and the tem-
 perature-dew point differences at two upper levels are combined into a graphical procedure
 to estimate the probability of occurrence of rainfall. With the probability of occurrence
 rising to above 50 percent, supplementary charts are used to estimate the amount of rainfall
 to be expected. *Subject Headings: 1. Precipitation estimation 2. Precipitation forecasting
 3. San Francisco, Calif. I. Neyman, J.—Author's abstract.*

5.7-66

551.509.5

Paulhus, J. L. H. and Gilman, C. S. (*U. S. W. B., Wash., D. C.*), **Evaluation of probable
 maximum precipitation.** *American Geophysical Union, Transactions*, 34(5):701-708, Oct.
 1953. 5 figs., 2 tables, 8 refs. **MH-BH**—An outline of methods developed for the evaluation
 of maximum precipitation from design storms as used by hydrometeorologists in U. S.
 particular the maximization by moisture adjustment on the basis of the highest observed de-
 point and the transposition of storms is discussed, showing also the relation of probable max-
 imum precipitation to major observed rainfalls for the Eastern United States. *Subject Head-
 ings: 1. Maximum possible precipitation 2. Design storms 3. United States.—A.A.*

5.7-67

551.509.5

§Teweles, Sidney, Jr., **A test of the relation between precipitation and synoptic pattern
 at 200 and 300 millibars.** *Journal of Meteorology*, 10(6):450-456, Dec. 1953. 9 figs., table,
 refs., 2 eqs. **MH-BH**—A test of possibility of predicting precipitation over U.S.A. from
 300 mb charts was made using observed field of vorticity advection at 300 mb. Relation
 between precipitation and field of 300 mb height-change advection and 200 mb temperature
 advection gave better verification but the main conclusion is that although some relation
 present it is not close enough for accurate forecasting of precipitation without information
 from lower levels. *Subject Headings: 1. Precipitation forecasting 2. Objective forecasting
 C.E.P.B.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE—IONOSPHERE

See also: Electric currents in ionosphere (Baker, Martyn), 5.7-2; Diurnal variation of nuclei content of air, Berlin (Würfel), 5.7-139.

5.7-68

551.510.41:546.33:551.593.55

Hunten, D. M., A study of sodium in twilight. I. Theory. *Journal of Atmospheric and Terrestrial Physics*, 5(1):44-56, March 1954. 8 figs., 22 refs., eqs. Also Hunten, D. M. and Shepherd, G. G., A study of sodium in twilight. II. Observations on the distribution. *Ibid.*, 6. 57-62. 3 figs., table, 7 refs., eqs. MH-BH—I. The chemical equilibrium of sodium with other constituents of the atmosphere leads to an exponential distribution of free atoms, as found by D. BARBIER from sodium twilight emission. Owing to uncertainty in distribution of O, 3 models of sodium distribution are investigated but give similar relative contributions to total scattered light from different heights. The ionization of sodium by UV radiation and recombination are calculated and lead to the observed annual and diurnal variations of twilight glow and nightglow. II. Describes observations of D-lines in twilight with a recording auroral spectrometer. These are best fitted by an exponential distribution of sodium above and below a sharp peak of about 10^4 atoms/cc, probably associated with transition from O₂ to O. Subject Headings: 1. Atmospheric composition 2. Sodium emission 3. Twilight phenomena. Shepherd, G. G.—C.E.P.B.

5.7-69

551.510.41:546.214

Neuwirth, R., Über Messungen des bodennahen Ozons in Südwestdeutschland. [Measurements of ozone near the ground in Southwest Germany.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen, 1951/1952*. p. 155-168. 9 figs., 2 tables, 16 refs. DWB—Study based on ozone measurements at different places in Baden, extended over $2\frac{1}{2}$ years. An attempt is made to correlate the results with static and dynamic lability, wind direction, air masses, wind shear at 850 mb, simultaneous values at different stations, etc. Higher ozone content was observed for surface winds from the east. The air masses did not show significant differences, except for maritime cold air. Subject Headings: 1. Ozone near the ground 2. Ozone measurements 3. Baden, Germany.—A.A.

5.7-70

551.510.41:546.214:551.558

Neuwirth, R., Unterschiede im Luftaustausch einer Gipfel- und einer Hochtalstation nachgewiesen durch Messungen des bodennahen Ozons. [Differences in air exchange at a summit and at a high valley station shown by measurements of ozone near the ground.] *Meteorologische Rundschau*, 6(11/12):201-204, Nov./Dec. 1953. 5 figs., 19 refs. DWB—Incidence of maxima of surface ozone content at St. Blasien (mountain valley, 785 m) and Feldberg (peak, 1500 m) in the Black Forest, Oct. 1952–April 1953, shows systematic differences related to air motion. At Feldberg maxima occur most often on very cloudy or misty days with little or decreasing sunshine, at St. Blasien on clear days with high or increasing sunshine. The ozone maxima at St. Blasien are attributed to solar radiation, those at Feldberg to horizontal shearing accompanying a large-scale circulation, which can overcome the destructive effect on ozone of high humidity. Subject Headings: 1. Ozone variations 2. Vertical motion.—C.E.P.B.

5.7-71

551.510.41:546.214

*Zimmerman, G., Kleinklimatische Ozonmessungen in Bad Kissingen. [Microclimatic ozone measurements in Bad Kissingen.] *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 1, June 1953. 11 p. fig., 10 tables. DWB—Ozone measurements near the ground were made on clear days comparing the conditions on a street, meadow or field, in a park, forest, etc. Ozone content sharply decreases with an increasing concentration of exhaust gases, increases with wind speed and decreases with relative humidity. There was no indication that ozone is partly produced near the earth's surface on the sharp ends of grasses, needles, etc. as assumed by CAUER, but it more likely that ozone is transported downwards from the stratosphere. Subject Headings: 1. Ozone near the ground 2. Microclimatic ozone measurements 3. Bad Kissingen, Germany.—A.A.

5.7-72

551.510.42:551.578.41 551.594.14:551.578.4

Garrigue, Hubert, **Observations sur les impuretés contenues dans l'air libre.** [Observations of impurities in the free air.] *Académie des Sciences, Paris, Comptes Rendus*, 236 (24) 2309-2311, June 15, 1953. refs. DWB—Measurements of atmospheric impurities as reported from the Puy de Dôme peak (1450 m) and various points within 500 m below the peak (Jan.-Feb. 1953). The measurements were made by analyzing residual matter obtained from evaporated snow samples; 10^4 - 10^6 radioactive atoms (probably fission products) and 0.01-0.1 g of dust and soot were identified per liter of precipitation. The synoptic situation prevailing during the sampling are specified. The dust and soot are attributed to local factors while the radioactive matter is thought to be of very remote origin (in respect to both space and time), which would mean that it affects large areas. *Subject Headings:* 1. Dust content of snow 2. Radioactivity of snow 3. Snow analysis.—G.T.

5.7-73

551.510.42 (41)

Great Britain. Committee on Air Pollution, **Interim report.** London, 1953. Its Circ. 9011. 31 p. figs., map, 9 tables. GB-MO—This report outlines the problems of preventing industrial and domestic smoke and recommends control measures, especially for periods of persistent fog. The main sources of pollution are tabulated. The effects of air pollution on health are shown by weekly tables and graphs of death rates in London and amounts of sulphur dioxide and smoke during Dec. 1952 and winter 1952/3. Finally, legislative provisions and possible preventive measures are discussed. Appendices illustrate smoke indicators for fluorimetry. *Subject Headings:* 1. Atmospheric pollution 2. London England.—C.E.P.B.

5.7-74

551.510.53:551.5

Weekes, K., **The physical state of the upper atmosphere.** *Royal Meteorological Society Quarterly Journal*, 80(343):2-15, Jan. 1954. 2 tables, 46 refs. DWB—Upper atmosphere defined as 5% lying above 20 km. Composition is nearly uniform up to at least 60 km and appreciable diffusive separation is unlikely below 100 km. Absorption of UV radiation leads to formation of O_3 in 20-50 km and atomic O in 90-140 km. Dissociation of N_2 and H_2 is discussed. Temperature and pressure distribution inferred in 1947 is compared with results of rocket experiments; a table of density, particle density and temperature up to 160 km shows minimum temperature (200°K) at 80 km and maximum (468°K) at 160 km. Absence of seasonal or diurnal variation indicates efficient cooling. Theory of winds and movements is discussed. Measurements show winds of about 100 m/s and a rather turbulent atmosphere in 80-120 km. Movements of ionization show drifts mostly 20-150 m/s with a large seasonal component and magnetic disturbance effect in E and F layers but caution is necessary in interpreting results. *Subject Headings:* 1. Upper atmosphere research 2. Stratospheric winds.—C.E.P.B.

5.7-75

551.510.535:621.1

Bramley, E. N., **Direction-finding studies of large-scale ionospheric irregularities.** *Royal Society of London, Proceedings, Ser. A*, 220(1140):39-61, Oct. 22, 1953. 12 figs., 4 tables, 17 refs., eqs. DLC—Directional measurements on pulse signals of 2-15 Mc/s in Britain reflected from ionosphere at vertical and oblique incidence, are interpreted in terms of ionospheric tilts. Some measurements point to drifting clouds of ionization in Es layer. In F layer ripples in surface of constant ionization density are found, wave length 50-400 km (peak 150 km), vertical amplitude increasing with wave length to 7 km, speed up to 350 m/s (peak at 150 m/s). They mostly move W-E before 14 h U.T., E-W after 14 h, due to a clockwise rotation. *Subject Heading:* 1. Ionospheric movements.—C.E.P.B.

5.7-76

551.510.535:551.1

Ibrahim, Z., **Ionospheric current systems.** *Mathematical and Physical Society of Egypt, Cairo, Proceedings*, 4(4):43-51, 1952. figs., table, refs., 6 eqs. DWB—It is desirable that an attempt should be made to calculate the ionospheric current systems which would arise from the lunar atmospheric tidal motions as in the Stewart-Schuster "dynamo" theory. The differential equations for the current function, however, cannot be solved by orthodox methods so S. CHAPMAN suggested that a solution might be obtained by Southwell's relaxation method.

if the problem is simplified by neglecting the obliquity of the earth's magnetic axis, and assuming uniform conductivity, a solution can be obtained by orthodox mathematics. In this paper the simplified problem is solved by relaxation methods to test their reliability and the results obtained differ by less than two per cent from those obtained by orthodox methods. *Subject Headings: 1. Ionospheric currents 2. Lunar ionospheric tides.*—*From author's abstract.*

5.7-77

551.510.535:621.396

Munro, G. H., *Reflexions from irregularities in the ionosphere.* *Royal Society of London, Proceedings, Ser. A*, 219(1139):447-463, Oct. 7, 1953. 12 figs., 6 refs. **DLC**—Gives results of 4-year study at Sydney, Australia, of small daytime changes in virtual height of F-region reflections with periods of 10 min-1 hr on 5.8 Mc/s, using 3 pulse transmitters 50 km apart. Disturbances are classed as X (loop), Y (branch) and Z types. The complexities are special cases of reflection from curved surfaces, associated with travelling disturbances, and occur frequently. The differences of type result from different group retardations along different paths. *Subject Heading: 1. Ionospheric structure.*—*C.E.P.B.*

5.7-78

551.510.535

Rawer, Karl, *L'effet de l'équateur magnétique sur l'ionisation de la couche Es.* [Effect of the magnetic equator on the ionization of the sporadic E-region.] *Académie des Sciences, Paris, Comptes Rendus*, 237(18):1102-1104, Nov. 2, 1953. 4 refs. **DWB**—Top frequency of sporadic ionization at the magnetic equator only occurs with respect to the centers of "ionization clouds" and not for minimum ceiling. The effect only takes place during daytime. *Subject Heading: 1. Sporadic E layer (Es).*—*Author's abstract (trans.).*

5.7-79

551.510.535:551.594.51

Rawer, K., *Sporadic E ionisation.* *International Council of Scientific Unions. Mixed Commission on the Ionosphere, 2nd Meeting, Brussels, Sept. 1950, Proceedings*, Publ. 1951. p. 114-119. 12 refs. **DWB**—A strong correlation exists between the magnetic disturbances in the auroral zone and (E aurora) ionization at the height of the auroral zone, whereas no such correlation exists between Es (sporadic E layer disturbances) in lower latitudes and magnetic storms. Es data for 40 days (April-Oct. 1944) at 3 stations in Germany and one at Athens (360, 720 and 1800 km apart) were correlated and usually a positive correlation was found. No interdiurnal correlation between correlations was found. Small, highly ionized centers are found in the Es layer. *Subject Headings: 1. Sporadic E layer (Es) 2. Auroral layer ionization.*—*M.R.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: Atmos. physics (Khrgian), 5.7-7; Kinetic energy of atmos. (Pisharoty), 5.7-9; Seasonal heat storage in surface layers of earth (Schumann, Burdecki), 5.7-10; Northern Gulf LOW, Feb. 14, 1953 (Jones, Roe), 5.7-52.

5.7-80

551.511:551.547:551.524.3

Griesseier, H., *Durch periodische Wärmezufuhr bzw. Wärmeentziehung bedingte Zustandsänderungen in einer anfänglich unbewegten isothermen Atmosphäre.* [Changes of state in an initially stationary isothermal atmosphere caused by periodic advection or removal of heat.] *Zeitschrift für Meteorologie*, 6(10):309-316, Oct. 1952. fig., 2 tables, 12 refs., 54 eqs. **MH-BH**—An attempt to determine the physical conditions characterizing a circulation system which can arise in a frictionless compressible and initially stationary isothermal atmosphere as a result of a periodic advection or removal of heat which begins at a definite moment of time. The system of linearized hydrothermodynamic field equations is integrated under the assumption that heat advection or removal which occurs periodically in space and time, dies out exponentially with increasing elevation. The applicability of the derived formulas is tested by means of a numerical example. As a consequence of the expansion of air produced by the warming, the pressure increases in the heated air mass aloft; the pressure falls when the air is cooled. *Subject Headings: 1. Thermodynamics of the atmosphere 2. Baric topography 3. Temperature variations.*—*I.L.D.*

5.7-81

551.511:551.52

*†Houghton, Henry G., **On the annual heat balance of the Northern Hemisphere.** *Journal of Meteorology*, 11(1):1-9, Feb. 1954. 4 figs., 6 tables, 30 refs. **MH-BH**—The heat balance of the N. Hemisphere is reexamined using means of total solar and sky radiation from pyrheliometric data in N. America (30-65°N), extrapolated to entire hemisphere by mean cloud cover and precipitable water and Smithsonian transmission data. Results for each 10° latitudes are shown in a table of seasonal and annual values. The disposition of solar radiation at surface and planetary albedo are calculated for normal cloud cover; surface albedo ranges from 0.07 (0°) to 0.56 (pole), planetary from 0.283 (20°N) to 0.669 (pole), taking latest values of albedo of snow (0.7-0.55), oceans (0.064-0.083) and clouds (mean 0.55). Annual mean outgoing long-wave radiation is calculated for each latitude. From these figures the poleward flux of heat is found, reaching a maximum of 11.12×10^{19} cal/day in 40°N. The heat balance between earth and atmosphere is analyzed schematically. *Subject Headings: 1. Heat balance 2. Radiation balance 3. Northern Hemisphere.*—*C.E.P.B.*

5.7-82

551.5

Robitzsch, Max, **Tropfenadiabaten.** [Drop adiabats.] *Zeitschrift für Meteorologie*, 7(6):172-175, June 1953. fig. **MH-BH**—The formulas for constructing constant equivalent temperature and moist adiabatic laws are $\theta = T' + \frac{1510 E'}{p} = \text{const.}$ and $p = \frac{1510 E'}{\text{const.} - T'}$ (T' = wet bulb temperature; p —atmospheric pressure, E' —saturation vapor pressure at wet bulb temperature) and they are valid for flat surfaces. For curved surfaces such as neutral point drops of water curves of constant equivalent temperature are derived by considering a water vapor function characteristic of drop with radius r . A moist adiabatic diagram for drops of various radii is presented. These curves in contrast to adiabats for flat surfaces diverge with high pressures and temperatures but they converge regardless of radius at $p=0$ and $T'=0$. The temperature at different pressure levels determined from the curves represents the temperature difference at a given pressure, between a drop and the ambient atmosphere or a drop with a different dimension. The applications of drop adiabats to thermodynamic processes within a homogeneous fog or cumulus cloud is discussed. *Subject Headings: 1. Equivalent temperatures 2. Adiabatic diagrams 3. Drop adiabats.*—*I.L.D.*

5.7-83

551.5

Safronov, V. S., **O vozmozhnom istochnike energii dvizheniia mezhzvezdnoi materii** [The possible source of energy of motion of interplanetary matter.] *Akademiia Nauk SSSR Doklady*, 89(6):987-990, April 21, 1953. table, 11 refs., 8 eqs. **DLC**—In the preceding article (published in Transactions of the 2nd Conference on Cosmogony, Moscow, 1953) the author suggested a hypothesis for the source of energy of motion of interstellar matter. He assumed that the radiation of hot stars might be this source, and noticed that the energy radiated by the hot stars into space is 1-2 orders higher than the dissipating energy of the motion of interstellar matter clouds which is generated by their collisions, and also results from the extinction of turbulent motion inside these clouds. Present article gives the respective calculations explaining in detail the theoretical considerations on which the formulas are based. Effective and surface temperatures for various spectral classes of stars as well as coefficient depending on energy distribution in the spectrum are given in table. The highly probable amount of energy emitted by stars of hot spectral classes must be equal to about 10^{46} erg/gr/sec. Optical density of the interstellar space in direction of low galactic longitudes is great that ultraviolet radiation must be absorbed in full. The total amount of absorbed ultraviolet radiation for all directions is probably $\frac{2}{3}$ of emitted energy. *Subject Headings: 1. Interstellar matter motion 2. Energy of motion.*—*N.T.Z.*

5.7-84

551.

Schmeidler, F., **Simultane Ausbreitung von Konvektion und Wärme in der Atmosphäre** [Simultaneous extension of convection and heat in the atmosphere.] *Meteorologische Rundschau*, 7(1/2):1-6, Jan./Feb. 1954. fig., 7 refs., 19 eqs. **DWB**—Convection has a tendency to expansion which resembles that of molecular heat motion. Consequently convection is

rmally unstable zone tends to encroach on the stably stratified zone, inducing an adiabatic
 dient which facilitates further extension of convection. The process is described by two
 erential equations, the approximate integration of which gives a comprehensive theory of
 diurnal variation of temperature and turbulence in the atmosphere. The results explain
 secondary maximum of Austausch in the late evening found by LETTAU from the tempera-
 re profiles of JOHNSON and HEYWOOD. A consequence is that the maximum of thermal
 bulence occurs later with increasing height, and at several hundred meters should come at
 ht. **Subject Heading: 1. Convective activity.—C.E.P.B.**

5.7-85 551.511

Vulfson, N. I., **Metod izucheniiia konvektivnykh dvizhenii v svobodnoi atmosfere.**
 [Method of study of convective movements in the free atmosphere.] *Akademiia Nauk SSSR,*
Trudy, 91(2):233-236, July 11, 1953. 3 figs., ref., eq. **DLC**—The method of studying
 convective motion in the free atmosphere consists of horizontally flying an airplane equipped
 with a sensitive thermometer intersecting ascending air currents which are recorded as having
 temperature higher than that of the surrounding atmosphere. The temperature readings
 are recorded on an oscillograph. Data of an actual flight are given in a table graphically.
 The results of measurement indicate that: 1) convective movement on land consists of the
 continuous ascent of currents of air warmer than the surroundings; 2) convection occurs
 in layers; 3) the size of bubbles in currents is about 500 m in diameter; 4) the size of impulses
 (the difference between the maximum temperature in the current and that of the surroundings)
 is relatively small; and that up to 1500 m the average intensity of an impulse varies slightly
 with height in the case of relatively small currents with high temperatures. **Subject Headings:**
Convective motion 2. Upper atmosphere research 3. Airplane soundings.—I.L.D.

GENERAL CIRCULATION

See also: **Kinetic energy of atmos.** (Pisharoty), 5.7-9; **Characteristic properties of jet
 stream over Pacific** (Serebreny, Wiegman), 5.7-11; **Air currents and jet stream,**
Argentina (Georgii), 5.7-128.

5.7-86 551.513.1:551.557

Hubert, William E. (*Stockholm Univ.*), **A case study of variations in structure and circula-
 tion about westerly jet streams over Europe.** *Tellus*, Stockholm, 4(5):359-372, Aug. 1953.
 10 figs., 17 refs., 5 eqs. **MH-BH**—This paper contains a case study of multiple wind maxima
 over western Europe during January 1951. One stratospheric and two tropospheric jet
 streams (600 km apart) are shown over the British Isles, where the flow was almost zonal and
 quite steady latitudinally for the period discussed. The northernmost tropospheric jet stream
 lies locally as much as 3000 meters in height and 13 degrees in potential temperature during
 a 12-hour period. The southernmost maximum curves sharply southward downstream to
 pass over the Mediterranean where it is associated with a wave train separate from that over
 northern Europe. Two 30-hour mean cross sections (means of six observation times), at
 longitude 4° West and at longitude 10° East, show the space changes in wind, temperature and
 potential temperature in the exit region of the jet stream. Mean vertical velocities over the
 same 30-hour period are computed using several different techniques, and the errors in the
 computations due to restrictive assumptions are discussed. Neglect of ageostrophic com-
 ponents may change the vertical motion results by as much as 50%. The vertical-motion
 patterns are significantly suggested by some previous studies, with rising motions on the right
 side of the jet in the diffuence region. **Subject Headings: 1. Jet stream 2. Atmospheric
 circulation 3. Jet stream profiles 4. Europe.—Author's abstract.**

5.7-87 551.513.1

La Seur, N. E., **On the asymmetry of the middle-latitude circumpolar current.** *Journal
 of Meteorology*, 11(1):43-57, Feb. 1954. 26 figs., 13 refs., eqs. **MH-BH**—It is shown that the
 Northern Hemisphere circumpolar current is often not centered on the pole. Methods of measuring
 the eccentricity and of computing the zonal current around the circulation pole are described.
 Displacements of the pole occur down to 80°N along a narrow zone centered on longitude 180°.

Periods of large eccentricity occur mostly in Oct.—March and last about a week; during the strength of current is most concentrated and disturbance least. Broad-scale temperature and precipitation anomalies in U. S. during large eccentricity show systematic features. Asymmetry is tentatively related to surface friction and mountain barriers. *Subject Headings*

1. Zonal circulation.—C.E.P.B.

5.7-88

551.513.2:551.1

Nyberg, Alf (*Swedish Met. and Hydr. Inst.*), Note on "A further study on the relation between the jet stream and cyclone formation." *Tellus*, 5(3):316-317, Aug. 1953. 2 figs., 2 refs. Reply by H. Riehl, *ibid.*, p. 317-318. DWB—NYBERG questions the model presented by RIEHL and TEWELES, in several respects, but mainly the idea of cold air rising over the dome to the left of the jet stream. He says that the air is actually sinking, but due to advection the isentropes may rise. In his reply, RIEHL answers this point and brings up several other aspects of the effect of cold dome subsidence on the jet stream and on cyclogenesis. Abstract of original article see items 5.1-208 and 4G-127, Jan. 1954 and July 1953, *MAB*. *Subject Headings*: 1. Jet stream dynamics 2. Cold domes 3. Cyclogenesis. I. Riehl, H. M.R.

ATMOSPHERIC DISTURBANCES

See also: Vorticity and synoptic development (Farquharson), 5.7-53; Thermal thickness patterns and tropical storms (George), 5.7-56; Rainfall of depressions which move E near English Channel (Sawyer), 5.7-153; Rainfall depressions which move E across Scotland (Sawyer), 5.7-154.

5.7-89

551.515.13

Gleeson, Thomas A., Cyclogenesis in the Mediterranean region. *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 6(2):153-171, Dec. 1953. 20 figs., 2 tables, 5 refs. English, German and French summaries p. 153. DLC—A statistical study of surface meteorological data for 1929-39 and surface and upper air 1945-52. Tables and maps show type of cyclogenesis, monthly frequency and geographical distribution. Movement of cyclones in 24 hours related to topography and deepening. In Pt. II associated synoptic conditions are set forth including surface isobars 24 hours before and at cyclogenesis, and temperatures at 500 mb. Surface cyclonic trajectory tends to deviate to left of 3 km isobars but relation is small. See also 5.3-147, March 1954, *MAB*. *Subject Headings*: 1. Cyclogenesis 2. Mediterranean Region.—C.E.P.B.

5.7-90

551.515.2

*§Sherman, L. and Carino, Isidro, A study of Hurricane Able of 1952. [and] A study of Hurricane Baker of 1952. Florida. State Univ., Tallahassee. Dept. of Meteorology. Contract Nonr-988(01), Project NR 082 071, Technical Report (unnumbered), Aug. 20, 1952. Each section repaged. charts, refs. Also: A note on hurricane Able. *American Meteorological Society, Bulletin*, 35(5):220-222, May 1954. 4 charts, 5 refs. DWB—Surface and upper air streamline charts are presented for hurricane Able (Aug. 28 to Sept. 1, 1952), hurricane Baker (Sept. 3 to 6, 1952) to illustrate the method of analysis whereby the point of cyclonic indraft and the hyperbolic point are plotted for each 6 hours in respect to the position and movement of the eye of the hurricane. The analyses were made by two analysts independently and the results shown to agree very well. Forecast value is considered. *Subject Headings*: 1. Hurricane forecasting 2. Hurricane analysis 3. Hurricane "Able" (1952) 4. Hurricane "Baker" (1952) 5. West Indies. I. Florida. State Univ., Tallahassee. II. Dept. of Meteorology II. Contract Nonr-988(01).—M.R.

5.7-91

551.515.3:551.5

Malkin, W. and Galway, J. G. (*U. S. W. B., WBAN Analysis Center, Wash., D. C.*) Tornadoes associated with hurricanes. As illustrated by Franconia, Va., tornado, Sept. 1952. *Monthly Weather Review*, 81(9):299-303, Sept. 1953. 6 figs., tables, 17 refs. 3 refs. BH—One of the tornadoes associated with Hurricane Able, 1952, occurred near Washington, D. C., and simultaneously with the upper air sounding made there. This led to a comparison

tween this particular tornado, along with others of similar environment, and conditions attributed to tornadoes in general. All such tornadoes associated with hurricanes have to date been observed only in the forward semicircle or along the advancing periphery of the tropical storm. The evidence is strong in favor of time of day having little relation to the occurrence of such tornadoes. A hypothesis is suggested wherein the weaker or nonexistent cyclonic horizontal wind shear of the environment may contribute to the lesser severity of these tornadoes. Unlike the typical tornado sounding, the limited evidence indicates the presence of (1) a low level temperature inversion, (2) sharp moisture stratification of dry air over moist air, (3) excessive instability. *Subject Headings:* 1. Tornadoes associated with hurricanes 2. Hurricane "Able" (1952) 3. Tornadoes 4. Franconia, Virginia.—*Authors' abstract.*

5.7-92

551.515.8:629.13

*Bray, J. T., *The squall line as a factor in airline operations.* [1952?] 58 p. 7 figs., refs. Typescript.—A thorough and logical treatment of the phenomenon known as the squall line, and of its by-products (thunderstorms, tornadoes and severe turbulence). The theories which have been advanced for the "cause" of the squall line are critically reviewed and the theory of advection of cold air at 500 mb or above over an area of developing cumulus clouds in warm moist air (700-850 mb) recommended as the most tenable. It is thought that even a slight cold air advection (1° or 2°) will trigger a thunderstorm and it will then propagate itself S+E, sometimes in several lines of thunderstorms, with old ones dying out in rear. Examples are analyzed with special attention to those which have produced serious aircraft accidents in the middle west or Ohio valley. TEPPER's pressure jump theory is criticized in the light of the author's hypothesis. Operational importance of squall lines pointed out and recommendations for administrative use in flying and in airline meteorology, given. *Subject Headings:* 1. Squall lines 2. Aeronautical meteorology 3. Pressure jump theory.—*M.R.*

RADIATION AND TEMPERATURE

RADIATION

See also: Solar radiation and soil temp. (Ashbel), 5.7-1; Long range effects of sun's variation on temp. in Wash., D. C. (Abbot), 5.7-57; Solar variation and precip., Albany, N. Y. (Abbot), 5.7-59; Solar variation and precip., Peoria, Ill. (Abbot), 5.7-60; Annual heat balance of N. Hemisphere (Houghton), 5.7-81; Climatological and astronomical interpretation of Ice Ages (Öpik), 5.7-186; Bibliography on global radiation, p. 829-855.

5.7-93

551.521.3:533

*†Watanabe, K.; Zelikoff, Murray and Inn, Edward, C. Y., *Absorption coefficients of several atmospheric gases.* U. S. Air Force. Cambridge Research Center, Geophysical Research Papers, No. 21, June 1953. 79 p. 14 tables, 31 figs., bibliog. p. 76-79, 7 eqs. *AFCRC Technical Report*, No. 53-23, June 1953. DWB—Absorption coefficients, k of O_2 , O_3 , CO , O_3 , NO , N_2O , N_2 , H_2O , H_2 , CH_4 , and NH_3 were measured in the spectral region from 1050 to 2500 Å. Using a linear photoelectric detector and an absorption cell at the exit slit of a vacuum monochromator, the improved method eliminated systematic errors. Several thousand k -values were determined and a number of new bands and continua were found. Energy rates and dissociation limits are discussed. The ionization potentials of NO and NH_3 were found to be 9.23 ev and 10.12 ev, respectively, by measuring the long wavelength limit of the ionization continuum. Ionization cross sections of NO in the region from 1080 to 1345 Å were obtained. Some of the data were applied to the formation of the D layer. *Subject Headings:* 1. Absorption coefficients 2. Ionization 3. Atmospheric gases.—*Authors' abstract.*

5.7-94

551.521.32

Berthier, Pierre, *Altitude de l'émission des bandes du proche infrarouge des molécules H et O_2 de la haute atmosphère durant la nuit.* [Altitude of night-time emission of the near infrared bands of molecular OH and O_2 in the upper atmosphere.] *Académie des Sciences, Paris, Comptes Rendus*, 237(16):928-930, Oct. 19, 1953. 2 tables, 3 refs. DWB—Photo-

metric measurements of the two bands were made simultaneously at two different zenith angles. The results appear to exclude the possibility of altitudes lower than 100 km, and indicate values near 130–150 km. *Subject Headings:* 1. Emission layers 2. Infrared spectrum copy.—*Author's abstract (trans.).*

5.7–95

551.521

Falckenberg, G., *Ein Beitrag zu dem Problem der Eigenstrahlung der freien Atmosphäre* [A contribution to the problem of radiation of the free atmosphere.] *Zeitschrift für Meteorologie*, 7(6):162–167, June 1953. 4 figs., 11 refs. MH-BH—The literature dealing with infrared radiation of the free atmosphere and its effect upon the heat balance of the atmosphere and hence upon weather processes is summarized. The author's earlier observations on the increase of the factor $G_2/\sigma T^4$ (the rates of the so-called radiation from the G_2 to black body radiation at air temperature) with height and various explanations for this phenomenon are discussed. The construction of an actinometer for measuring counter radiation with precision during airplane flight is described with the aid of a diagram. *Subject Headings:* 1. Global radiation 2. Airborne actinometers.—*I.L.D.*

5.7–96

551.55

Roach, F. E.; Pettit, Helen B.; Williams, D. R.; St. Amand, P. and Davis, Dorothy (U. S. Naval Ordnance Test Station, China Lake, Calif.), *A four-year study of [OI] 5577 the nightglow*. *Annales d'Astrophysique*, Paris, 16(4):195–205, July/Aug. 1953. 15 figs., 9 tables, 15 refs. MH-BH—A systematic survey is made of 66 nights of observation of [OI] 5577 at Cactus Peak, California, from November 1948 to December 1952. The mean intensity of the radiation varies from 50×10^6 to 350×10^6 quanta/cm² column-second. The minimum intensity, the maximum intensity and the general level of activity are proportional to the mean intensity. No correlation between sunspot activity and the intensity of 5577 is found. The radiation shows a seasonal variation with a maximum in September to November and a minimum in May to July. A negative correlation between magnetic activity (K_p) and 5577 activity is indicated by the data. A comparison of results from 17 nights at the Haute-Provence Observatory with the Cactus Peak data indicates that the region of maximum intensity tends to be predominantly to the south at Haute-Provence and somewhat to the north at Cactus Peak. The data suggest the existence of an excitation wind moving from east to west in the evening, stopping during the middle hours (near the time of maximum intensity) and moving from west to east with a strong southerly component in the morning. *Subject Headings:* 1. Night airglow spectrum 2. Cactus Peak, Calif.—*Authors' abstract.*

5.7–97

551.521.63:551.5

Barbier, Daniel, *Photométrie de la région ultraviolette de la lumière du ciel nocturne* [Photometry of the ultraviolet region of the light of night sky.] *Académie des Sciences Paris, Comptes Rendus*, 236(3):276–277, Jan. 19, 1953. refs. DWB—A photometric study was made, at the Observatory of Haute-Provence, of the ultraviolet part of the light of night sky, consisting mainly of the Herzberg bands of O₂. The probable altitude of emission has been determined. Diurnal and annual variations in the intensity of these bands, exactly analogous with those of the green band. Three auroras, too weak to be seen with the naked eye, were registered. *Subject Headings:* 1. Night airglow spectrum 2. Ultraviolet radiation 3. Haute-Provence, France.—*Author's abstract (trans.).*

5.7–98

551.521.63:551.501

Colorado. Univ. Upper Air Laboratory, *Instrumentation phase of extreme ultraviolet research*. Contract W19-122-ac-9, The Zodiacal Light Eclipse Project, Final Report, March 1952. 22 p. 16 figs. DWB—The optics group of the Upper Air Laboratory has participated in the following activities: instrumentation; far ultraviolet radiation studies; testing of rocket flight equipment; fundamental experimental work pertaining to problems encountered in the upper atmosphere; and basic theoretical investigations suggested by the experimental results of the Group's activities. Instrumentation work has centered around the ultraviolet vacuum test chamber. The chamber, volume 450 liters, contains a grazing-incidence grating optical system. Three types of ultraviolet sources for the test chamber have been successfully

ned and constructed. An ultraviolet monochromator was designed, tested and constructed during the years 1949 and 1950. A small grazing-incidence, concave grating spectrograph was constructed and also flown in the rocket fired 12 April 1951. A photoelectric photometer capable of detecting individual spectrum lines in the far ultraviolet has been designed, constructed and tested. Experimental research undertaken by the Optics Group has centered around the instrumentation and use of the vacuum test chamber although several other types of problems have been investigated. *Subject Headings: 1. Ultraviolet radiation research 2. Rocket instrumentation. I. Contract W19-122-ac-9.—From author's abstract.*

5.7-99 551.521.63:546.214

Inn, Edward C. Y. and Tanaka, Yoshio (*U. S. A. F. Cambridge Research Center, Mass.*), **Absorption coefficient of ozone in the ultraviolet and visible regions.** *Optical Society of America, Journal*, 43(10):870-873, Oct. 1953. 3 figs., 15 refs. **DWB**—As an extension to previous measurements on absorption coefficients of ozone in the vacuum ultraviolet, similar measurements have been made in the near ultraviolet from the overlapping region at 2000 Å to about 3500 Å and in the visible from about 4000-7500 Å. The absorption coefficient measurements were made using ozone gas obtained by direct vaporization from liquid ozone of high purity (at least 90-95 percent) and the optical densities measured with a Cary recording spectrophotometer with a 10-cm quartz absorption cell. The method is essentially different from those used by previous investigators, e.g., photoelectric detectors instead of photographic, pure ozone instead of ozonized oxygen, and the absorption cell located at the exit slit instead of between the light source and entrance slit. The absorption coefficients obtained are somewhat consistently lower than those previously reported by NY and CHOONG, hitherto considered the most reliable. *Subject Headings: 1. Ozone absorption coefficient 2. Ultraviolet spectrum. Authors' abstract.*

5.7-100 551.521.64

Daudin, Alice and Daudin, Jean, **Effets atmosphériques sur les gerbes d'Auger.** [Atmospheric effects on Auger showers.] *Journal of Atmospheric and Terrestrial Physics*, 3(5):245-257, June 1953. 5 tables, 21 refs., 7 eqs. English summary p. 245. **MH-BH**—At Pic du Midi (2860 m) air showers have been investigated using banks of counters separated by 5 and 80 m. Results are tabulated. Pressure effect is -9% per cm Hg. A temperature effect is found due to its effect on air density at 300 mb level. The effect of air density is discussed in detail. *Subject Headings: 1. Cosmic ray showers 2. Auger showers.—C.E.P.B.*

5.7-101 551.521.64:537.591.15

Daudin, Alice and Daudin, Jean, **Les gerbes d'Auger dans l'atmosphère.** [Auger showers in the atmosphere.] *Journal de Physique et le Radium*, Paris, 14(3):169-174, March 1953. 1 table, 11 refs. **DLC**—The major Auger showers have been investigated for two years on the Pic du Midi (2860 m) and 80 m at 2860 m altitude (Pic du Midi). The considerable variations of background limited the advantage of high rates of count; the resistance of glass in the counters was also a hindrance at low temperatures. Pressure effects were found to be practically identical on the 5 m and 80 m ($-10.6 \pm 0.2\%$ and $-10.4 \pm 0.16\%$, respectively). On 5 m the temperature effect of -1% for each $^{\circ}\text{C}$ is entirely a result of a geometric effect of density which, incidentally, has been foreseen by the authors. This density effect becomes very significant with large air showers (>100 m) and large density in an ionization chamber. A detailed discussion shows that there exists between the two recordings of major air showers a correlation in respect to daily values of 0.35 for winter, which could be attributed to a yet unknown physical effect having an average amplitude of the order of 0.7% a day. The possibility of an effect exceeding 1% a day in winter, which would correspond to $\frac{1}{3}$ of the barometric effect, can be discarded. The absorption of Auger showers appears to decrease between 3000 m and sea level, which indicates a redistribution of the different radiations at the expense of nucleons and electrons and in favor of μ mesons. *Subject Headings: 1. Cosmic ray showers 2. Auger showers.—Authors' abstract (trans.).*

5.7-102 551.521.64

Daudin, Alice and Daudin, Jean, **Les gerbes d'Auger et la densité de la haute atmosphère.** [Auger showers and the density of the upper atmosphere.] *Académie des Sciences, Paris,*

Comptes Rendus, 236(13):1352-1354, March 30, 1953. 2 tables, refs. DWB—The correlation between the height of maximum intensity of high-energy atmospheric showers and various atmospheric layers expressed by isobaric levels is investigated. The shower maximum observed at 300 mb is attributed to a geometric effect of atmospheric layers above 100 mb. It is suggested that such a geometric effect might well result from the explosion of high-energy heavy nuclei near the top of the atmosphere. *Subject Headings*: 1. Auger showers 2. Cosmic ray showers 3. Atmospheric scattering.—G.T.

5.7-103

551.521.64:539(

†Powell, C. F., Mesons. *Physical Society of London, Reports on Progress in Physics*, 13:350-424, 1950. 42 figs., 4 tables, bibliog. p. 422-424, 3 eqs. DWB—A thorough and well outlined review of the tremendous quantity of literature and progress in this field. History of field, nomenclature, mass and mode of decay, and properties of π mesons and μ mesons, artificial production and creation by cosmic radiation; neutral mesons, other types of meson production of mesons in the atmosphere (p. 416-18), and outstanding problems constitute the principle chapters of this survey. *Subject Headings*: 1. Cosmic radiation 2. Meson production 3. Progress in physics.—M.R.

AIR TEMPERATURE

See also: Seasonal heat storage in surface layers of earth (Schumann, Burdecki), 5.7-10; Cumulative temp. (Lessmann), 5.7-39; Long range effects of sun's variation on temp. in Wash., D. C. (Abbot), 5.7-57; Precip. and temp., Wash., D. C., 1952-53 (Abbot), 5.7-58; Dew point and min. temp. forecasting after radiation nights (Plaetschke), 5.7-63; Changes of state in an initially stationary isothermal atmos. . . . (Griesseier), 5.7-80; Vertical structure of diurnal pressure and temp. changes (Schwarzl), 5.7-113; Correlation of density of new snow with 700 mb temp. (Diamond, Lowry), 5.7-161.

5.7-104

551.524.1:551.584.42

Netherlands. (K.) Meteorologisch Instituut, Handleiding bij het verrichten van temperatuurwaarnemingen op 10 cm hoogte. [Handbook of instruction for making temperature observations at 10 cm height.] Netherlands. K. Meteorologisch Instituut, [Uitgave], No. . . . n.d. 12 p. 3 figs. DWB—A small but useful set of instructions for making special (meteorological) temperature observations at 10 cm above the ground, such as is done at many places in the Netherlands in field crops. The details of the special thermometers and screens (illustrated), the selection of the place for observation, the installation of the thermometers, the thermometers, defects and calibration of thermometers and, finally, for recording the effect of frost, etc. on plants such as potatoes and strawberries, are treated in separate sections. *Subject Headings*: 1. Micrometeorological observations 2. Temperature measurements 3. Observers manuals.—M.R.

5.7-105

551.524.2:60

Thom, Herbert C. S. (U. S. W. B., Wash., D. C.), The relational relationship between heating degree-days and temperature. *Monthly Weather Review*, 82(1):1-6, Jan. 1954. 3 figs., table, 5 refs., 10 eqs. DWB—Almost from the time that heating degree-days came into use there has been a need for a rational relationship between temperature and degree-day statistics. Such a relationship makes degree-day statistics quickly available for any place with a temperature record. The study reported here is another phase in a continuing effort to develop a more complete climatological analysis for degree-day data. The analysis begins with the development of the probability function of daily degree-days which was not previously available. Applying standard statistical operations to this function a rational relationship is developed. The rational formula is finally adjusted so that it may be employed with data presently available. *Subject Headings*: 1. Degree days 2. Temperature calculations.—From author's introduction.

5.7-106

551.5

*Weather Bureau issues new degree day normals. *Heating, Piping & Air Conditioning*, Chicago, 25(11; 12):133-134; 109-110, Nov.; Dec. 1953; 26(1; 2):181-182; 110, Jan.; 1954. mostly tables. DWB—Monthly and annual degree day normals are tabulated

er 300 airports and cities throughout the United States. The stations are arranged by
tes. The values have been computed on the standard 65F base from U. S. Weather Bureau
ords covering the period 1921-1950. *Subject Heading: 1. Degree day data.—G.T.*

5.7-107

551.524.32:523.74

*Voigts, Heinrich, *Gang der Jahresmitteltemperaturen im Sonnenfleckenzyklus. III. Mit-*
ung. [The variation of the annual mean temperature in sunspot cycle. III. Report.]
tschrift für Meteorologie, 7(6):183-188, June 1953. 2 figs., 5 tables, 11 refs. **MH-BH**—
rther data on the variation of temperature during a sunspot cycle are presented for the
thern Hemisphere: São Paulo, Sydney, Adelaide, Brisbane and Alice Springs. The curves
Adelaide and Sydney and for São Paulo are similar and show a principal maximum during
sunspot minimum and a principal minimum during the sunspot maximum. The curves
Alice Springs, Brisbane and Port Darwin show a double oscillation. Also a long series
Leipzig (1871-1951) and Prague (1778-1947) is evaluated; here the temperature maximum
close to the sunspot minimum and the temperature minimum close to the sunspot maximum.
e curves obtained differ from those of a previous series, since Prague is at the boundary
ween east European and central European influence. Correlation between sunspot curve
l temperature deviation from normal is very variable for Leipzig, probably also as a result
its boundary position. Data on temperature variations are given in tables. *Subject*
adings: 1. Annual temperature variations 2. Sunspot cycles 3. Southern Hemisphere.—
.D.

SOIL TEMPERATURE

See: Solar radiation and soil temp. (Ashbel), 5.7-1.

LAKE TEMPERATURE

See also: Seasonal storage of heat in surface layer of earth (Schumann, Burdecki),
5.7-10.

5.7-108

551.526.8(436)

*Hofstetter, G., *Der Einfluss meteorologischer Faktoren auf die Temperatur alpinen Seen.*
he influence of meteorological factors on the temperature of Alpine lakes.] *Archiv für*
eteorologie, Geophysik und Bioklimatologie, Ser. B, 5(2):146-181, 1954. 7 figs., 12 tables,
refs. German, English and French summaries p. 146-148. **DLC**—This close analysis
the factors affecting surface temperature of lakes is based on correlations of interdiurnal
anges (7h-7h, 1939-43) of 10 lakes in sunny and cloudy weather with air temperature,
hshine, cloud, rainfall and wind. Considerable warming (up to 2-3°C/day) is caused
ainly by solar radiation in March-Sept.; fine weather in Oct.-Feb. usually brings slight
oling. Cloudy days generally bring cooling in summer. Heat transfer air-water is much
re effective than water-air, cooling by relatively cold air exceeding warming by warm air,
t monthly water and air temperatures give $r = +0.6$ to 0.8 . Strong cold winds, especially
undersqualls, cause marked cooling. Heavy rain in summer causes cooling through mixing
surface water with cold from streams and rivers. *Subject Headings: 1. Lake temperatures*
Austria.—C.E.P.B.

PRESSURE AND WIND

PRESSURE

See also: Evaluation of methods and techniques of forecasting heights of constant pressure
surfaces (Stephens, others), 5.7-12; Techniques for estimating heights of constant
pressure surfaces (Duthie, Haltiner), 5.7-32; Application of mean pressure values,
40°N and 50°N, to extended forecasting in winter (Akedo), 5.7-62; 5-day mean
pressure, 40°N and 50°N for 1 week forecasting (Akedo), 5.7-61; Ionospheric current
systems (Ibrahim), 5.7-76; Changes of state in an initially stationary isothermal
atmos. . . . (Greisseier), 5.7-80; Simple models of meteorobiological reactions in their
relation to pressure and solar activity (Bortels), 5.7-188.

5.7-109

551.543

Burriss, Richard C. (*U. S. A. F.*), *Standard deviation of sea-level pressure in the United*
ates. Florida. State University. Dept. of Meteorology, Contract NONR-988(01),

Project NR 082 071, Technical Report (unnumbered), Jan. 15, 1954. 15 p. 5 figs., 2 tables, 6 refs. **DWB**—Standard deviations of Jan. and July sea level pressure at 115 stations in U. S. and Canada are computed for five years of data. Some possible reasons for the variation in the standard deviations are discussed. The magnitudes of the standard deviations are correlated with the frequencies of cyclone passages. The correlation coefficient is higher for stations at low elevations and is higher for July than for January. *Subject Headings: 1. Standard deviation of pressure 2. Sea level pressure 3. United States. I. Florida. State University. Dept. of Meteorology II. Contract Nonr-988(01).*—*Author's abstract.*

5.7-110

551.543:519.24

*Massachusetts Institute of Technology, **Extended forecasting project.** Contract CW-8142, Final Report for the Period July 1, 1951–June 30, 1952. 57 p. 6 figs., 10+8 tables. Typescript. **DWB**—Tables are given for 5-day mean zonal and meridional indexes in the Northern and the Southern Hemisphere for the first three months of 1950 (pressure differences for sea level, 700 and 500 mb, maximum pressure differences in 20° zones, mean N-S wind component across different latitudes, mean sea level pressures for the whole Northern Hemisphere and parts of the Northern and Southern Hemisphere solenoids). Numerous correlation coefficients between these indexes are given for 15 months (1949–1950). The relations to solar phenomena are discussed and the various activities of the project are summarized. *Subject Headings: 1. Pressure indexes 2. Correlation coefficients 3. Solar influence. I. Contract Cwb-8142 II. Willett, Hurd Curtis.*—*A.A.*

5.7-111

551.5

Piasecki, Dionizy, **Przebieg ciśnienia atmosfery cznego we Wroclawiu, od 1.II.1946 do 31. II.1947.** [Variations of atmospheric pressure in Wroclaw from Feb. 1, 1946 to Feb. 31, 1947.] *Wroclawskie Towarzystwo Naukowe, Prace, Ser. B*, No. 32, 1951. 27 p. 11 graphs, 5 tables, 28 refs. **DLC**—An analysis of pressure waves based on readings from a simultaneous investigation carried out earlier by GRUNDMANN for the period 1852–1878. The comparison shows important distinctions especially of the pressure curve and in such important features as succession and distribution of pressure maxima and minima. After having discussed the correctness of results of both investigations, the author concludes that his pressure curve is more authoritative in spite of the fact that the investigated period was only two years. *Subject Headings: 1. Pressure variations 2. Wroclaw, Poland.*—*A.M.P.*

5.7-112

551.5

Williams, D. T. (*Tornado and Severe Storm Project, W. B. Regional Office, Kansas City, Mo.*), **Pressure wave observations in the Central Midwest.** *Monthly Weather Review*, 81:278–289, Sept. 1953. 18 figs., 5 tables, 15 refs. **MH-BH**—Data from the 1952 Tornado and Severe Storm Observational Network indicate that pressure waves (abrupt variations in surface pressure) occur frequently in the central Midwest. These waves are classified and studied statistically for relationships with certain weather phenomena. Elevation type wave lines are found to coincide with certain synoptic discontinuities (squall lines, cold fronts, etc.). Thunderstorm activity accompanied 78 percent of these lines, and tornadoes occurred with 10 percent. Data on the motion of elevation type wave lines, and on the size, amplitude, and duration of their fields of activity are summarized. A marked tendency for these waves to occur during nocturnal hours is found. Depression type wave lines are found not to coincide with ordinary synoptic discontinuities. A combination type wave is described and speculation on its significance is made. Examination of the relation of tornadoes to pressure waves shows a tendency for tornadoes to occur in specific portions of the elevation wave lines. *Subject Headings: 1. Pressure waves 2. Atmospheric disturbances 3. Tornado data 4. western United States.*—*Author's abstract.*

5.7-113

551.547.3:551.1

Schwarzl, S., **Der vertikale Aufbau der täglichen Druck- und Temperaturänderungen [The vertical structure of diurnal pressure and temperature changes.]** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 6(2):172–200, Dec. 1953. 9 figs., 6 tables, 58 refs. German, English and French summaries p. 172–173. **DLC**—For 78 points 10°W–90°W.

0°–70°N. Jan.–June 1943, daily values were read off of surface pressure, heights of 500, 225 and 96 mb surfaces and 500–1000 mb thickness, and interdiurnal changes were computed. These were divided into groups according as signs of changes of different pairs of variables agreed or differed. Frequencies of groups are plotted and discussed. The part of each in the total change of pressure is considered. Effect of land-sea distribution and lee effects in Baltic and Po plain are examined. A general picture of the vertical changes in the different groups is constructed. *Subject Headings: 1. Upper air pressure changes 2. Upper air temperatures. C.E.P.B.*

WIND

See also: New devices to measure turbulence in wind tunnel or atmos. (Bass), 5.7–47; Experiments on atmos. turbulence . . . (De Pasquale), 5.7–49; Vanishing mechanism of sea fog, role of turbulence (Imahori), 5.7–144; Relationship: number of nuclei, wind speed, visibility and humidity, Baltic Coast (Zenker), 5.7–141; Wind force on conifer tree and fog water thereby captured (Yoshida, Kuroiwa), 5.7–193.

5.7–114

551.551

Davidson, Ben and Lettau, Heinz (*U. S. A. F., Cambridge Res. Center*), **The Great Plains turbulence field program.** *Weatherwise*, 6(6):166–169, Dec. 1953. illus. DWB—The project described in this article was organized by the Air Force Cambridge Research Center to study wind, turbulence and diffusion in the lower 5000 ft of the atmosphere. The various government institutions and universities collaborating in this project sent representatives and special equipment which was installed and operated on a section 6 mi east of O'Neill, Nebraska, during Aug. and Sept. 1953. A total of 174 hours (7 complete days) of intensive observations of simultaneous turbulent wind, temperature and moisture conditions and gradients, and outgoing and incoming radiation as well as soil moisture and temperature conditions were obtained and are being analyzed. Smoke puffs and tandem (vertical) balloons were used to study wind structure. G. LOESER lost his life in a helicopter accident. *Subject Headings: 1. Great Plains turbulence Project 2. Turbulence research 3. Micrometeorological turbulence 4. O'Neill, Nebraska.—M.R.*

5.7–115

551.551

Hesselberg, Th., **Some notes on the atmospheric eddy movements and friction.** *Meteorologische Annaler*, Oslo, 3(11):285–293, 1953. figs., refs., 14 eqs. MH-BH, DWB—Emphasizes that the "mean" wind in turbulence studies should correspond to the mean specific momentum and not to the mean velocity of the air. The transport of eddy movements, the variations of the eddy movements and of the coefficient of viscosity with the direction as well as the transport of an individual particle are analyzed, showing that the main principles had already been introduced by the author in 1915 or in subsequent publications. *Subject Headings: 1. Atmospheric turbulence 2. Turbulence theory.—A.A.*

5.7–116

551.551

Ogura, Y.; Sekiguchi, Y. and Miyakoda, K. (*Geophysical Inst. Tokyo Univ.*), **Classification of turbulent diffusions in the atmosphere.** *Meteorological Society of Japan, Journal*, 1(8):271–285, Aug. 1953. 3 figs., 15 refs., 6 eqs. MH-BH—The equations of turbulent diffusion of gas, small particles or heat are set out for: a continuous fixed source in: 1) a fluid flow, 2) a fluid at rest, 3) a continuous source moving with the wind and 4) an instantaneous source. Diffusion from a body source in an isotropic turbulent field taken up. The relation between Eulerian and Lagrangian autocorrelation functions is discussed. The Lagrangian function leads to the logarithmic velocity profile near the ground. *Subject Heading: 1. Turbulence theory.—C.E.P.B.*

5.7–117

551.551:551.557(94)

Radok, U., **Severe turbulence at high levels over New South Wales.** *Meteorological Magazine*, London, 83(980):48–52, Feb. 1954. 4 figs., 6 refs. MH-BH—Severe local clear air turbulence at 30,000 ft over New South Wales Aug. 22, 1951, is shown by upper air analysis

to have occurred on low pressure side of entrance to eastern branch of jet stream. It was probably localized by mountains to the south. *Subject Headings: 1. High level turbulence 2. New South Wales, Australia.—C.E.P.B.*

5.7-118

Rotta, J. C. (*Max-Planck-Inst. für Strömungsforschung*), *Similarity theory of isotropic turbulence*. *Journal of the Aeronautical Sciences*, 20(11):769-778, 800, Nov. 1953. 9 figs., table, 15 refs., eqs. DWB—Deals with the universal state of turbulence, characterized by only three magnitudes (characteristic velocity and length and kinematic viscosity), which is the final state of any arbitrary homogeneous and isotropic turbulence. Without using the idea of self preservation of the structure, a unique solution for all wave and Reynolds numbers is found. The theory is compared with turbulence measurements behind grids. *Subject Headings: 1. Statistical theory of turbulence 2. Similarity concepts 3. Isotropic turbulence.—A.A.*

5.7-119

Horney, Günter, *Ein Beitrag zur Häufigkeit hoher Windstärken in exponierten Lagen*. [A contribution on the frequency of high winds in exposed places.] *Meteorologische Rundschau*, 7(1/2):21-22, Jan./Feb. 1954. table. DWB—Most stations are so sited as to avoid strong winds, but Würzburg-Stein has from its orographic position an unusual frequency. To find out how many are missed if observations are made only at fixed climatological or synoptic hours, frequencies of each force from 6 to 12 are tabulated: 1) at any time of day, 2) at climatological hours, 3) at synoptic hours. *Subject Heading: 1. Strong wind frequencies.—C.E.P.B.*

WIND EFFECTS

See also: Wind effects on motion of sea . . . (Goldsbrough), 5.7-5.

5.7-120

Kashiyama, Tokuji; Takahashi, Kikumatsu and Kitamura, Kaichi, *On the diminution of fog density on the leeward of an artificially planted forest*. *Tokyo. Forest Experiment Station, Bulletin*, No. 64:44-55, Oct. 1953. 6 figs., 2 tables, 2 refs. In Japanese; English summary p. 55. DWB—Fog density and wind velocity were measured in front and in rear of an artificially planted forest along the line perpendicular to the direction of wind. Horizontal distribution of fog density and wind velocity obtained for various states of wind showed that the fog-decreasing effect by the forest was higher in degree than the wind-preventing action of it, when stand density and width of the forest were chosen at proper values. *Subject Headings: 1. Fog density 2. Wind velocity 3. Shelter belt effects.—Authors' abstracts*

5.7-121

Kyōichi, Takeda, *On the similarity law concerning air-flow in connection with forest*. *Tokyo. Forest Experiment Station, Bulletin*, No. 64:41-43, Oct. 1953. 4 refs. In Japanese; English summary p. 43. DWB—The dimension of the space on the leeward of a forest in which the wind velocity and fog density are diminished is discussed on the basis of the turbulence theories recently developed by INOUE, TANI and others. *Subject Headings: 1. Fog density 2. Wind velocity 3. Forest influences 4. Turbulence theory.—Author's abstracts*

5.7-122

Kyōichi, Takeda, *Study on artificially planted model forest*. *Tokyo. Forest Experiment Station, Bulletin*, No. 64:33-40, Oct. 1953. 2 tables. In Japanese; English summary p. 33. DWB—A model forest was established at Ochiishi, a sea village on the Pacific coast of the eastern part of the Hokkaido Island, by thrusting into the ground hundreds of rootless needle-leaved trees about two meters high. Many kinds of observations were made in this model forest in relation to its fog- and wind-preventing actions. *Subject Headings: 1. Fog prevention 2. Shelter belt effects 3. Ochiishi, Japan.—Author's abstract.*

5.7-123 551.556:551.311.31
 Masibroda, V. E., *Eolovyi rel'ef Turfanskoï vpadiny i Zapadnogo Bei-Shania kak otrazhenie mestnoi tsirkulatsii atmosfery*. [Anemoclastic relief of Turfanskii cavity and west Bei-Shan' as a reflection of local atmospheric circulation.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr.*, No. 2:25-35, 1952. 14 refs. **DLC**—Results of a detailed investigation of the origin of sand relief formation made on the basis of observations of Russian explorers (GRUMAN, MALIMOÏLO, OBRUCHEV, ROBOROVSKII, etc.) and aerial surveys of sand spaces in Middle Asia are presented and discussed. Joint analyses of wind-born forms of sand relief and of local atmospheric circulation in the limits of the Turfan depression and the western Bei-Shan' and the southern foothills of East Gian' Shan, confirm the accuracy of the dynamic theory (EDOROVICH and BLAGOVESHCHENSKII) asserting that the forms of the sand relief are the reflection of local atmospheric circulation on the ground. The basic and most important factor of sand relief formation is the wind regime which is determined by: 1) general conditions of circulation over a certain area, 2) the distribution of orographic features and 3) the character of interaction of the wind current and the underlying surface. *Subject Headings: 1. Sand dunes* *Wind effects.—A.M.P.*

5.7-124 551.556:634.9
 Weischet, W., *Zur systematischen Beobachtung von Baumkronendeformationen mit klimatologischer Zielsetzung*. [On the systematic observation of tree-crown deformations for climatological purposes.] *Meteorologische Rundschau*, 6(9/10):185-187, Sept./Oct. 1953. 14 refs. **DLC**—Preliminary report on an investigation in lower Rhine region into shaping and imaging effect of wind on tree crowns. Since different trees have different resistance, a scale devised according to species adaptation and degree of deformation. *Subject Headings: 1. Wind effects 2. Forests.—C.E.P.B.*

UPPER AIR WINDS AND VERTICAL MOTION

See also: Characteristic properties of jet stream over Pacific (Serebreny, Wiegman), 5.7-11; Differences in air exchange between summit and high valley station . . . (Neuwirth), 5.7-70; Physical state of upper atmos. (Weekes), 5.7-74; Variations in structure and circulation of westerly jet streams, Europe (Hubert), 5.7-86; Relation between jet stream and cyclone formation (Nyberg), 5.7-88; High level turbulence, New South Wales (Radok), 5.7-117; Air currents and jet stream (Georgii), 5.7-128.

5.7-125 551.557.2
 *†Jenkinson, A. F., *The average vector wind distribution of the upper air in temperate and tropical latitudes. Great Britain. Meteorological Research Committee, M.R.P.*, 823 (rev.), March 4, 1954. 5 p. 16 figs., 24 refs., 5 eqs. Mimeo. **GB-MO**—Revised charts are presented for levels of 500, 300, 200 and 100 mb for the world between 60°N and 50°S for Jan., April, July and Oct. They show stream lines and isotachs (lines of equal vector speed), based on geostrophic vector winds computed from mean MSL pressure charts with the addition of thermal vector winds in a succession of layers, constructed from upper air temperature charts recently prepared in the Meteorological Office. A grid of 234 points was used, checked by upper air wind data. *Subject Heading: 1. Upper air wind charts.—C.E.P.B.*

5.7-126 551.558.1:551.576.11
 Bunker, A. F.; Ludlam, F. H. and Scorer, R. S., *The stable subcloud layer and convective draughts. Royal Meteorological Society, Quarterly Journal*, 80(343):102-104, Jan. 1954. table. **DWB**—BUNKER corrects an error by LUDLAM and SCORER (*Quart. J., Roy. Met. Soc.*, 9:336, 1953) in their review of paper by BUNKER, HAURWITZ, MALKUS and STOMMEL (*Papers in Physical Oceanography and Meteorology* 1949) and by LUDLAM (*Quart. J., Roy. Met. Soc.*, 9:430, 1953) about a stable sub-cloud layer. *Subject Heading: 1. Stable sub-cloud layer.—C.E.P.B.*

5.7-127 551.558.1:59
 Scorer, R. S., *The nature of convection as revealed by soaring birds and dragonflies. Royal Meteorological Society, Quarterly Journal*, 80(343):68-77, Jan. 1954. table, 7 refs.

DWB—Observations by E. H. HANKIN (1913) of flight of soaring birds and dragonflies in I are summarized. Soaring by smaller birds begins when heat eddies can be seen on walls buildings, and by larger birds when the rising air extends to higher levels. Dragonflies only at lower levels in calm air. Soaring flight of swallows in Spain and England is descri Observations are interpreted as continuous upward streams from suitable points at low le supplying wider and stronger vertical currents which rise in bubbles at higher levels. *Subject Headings: 1. Thermals 2. Soaring of birds.—C.E.P.B.*

5.7-128

551.558.21

551.513.2:551.557

§Georgii, Walter (*Universidad Nacional de Cuyo*), **Problemas de la corriente ondulan y de chorro en la Argentina.** [Problems of the air current and the jet stream in Argentina *Revista Nacional de Aeronautica*, Buenos Aires, 13(131):33-37, Feb. 1953. 16 figs. *A La corriente atmosférica de chorro.* [The atmospheric jet stream.] *Ibid.*, 13(132):42 March 1953. 14 figs. DWB—Informative articles on the vertical structure of air cur over and to the lee of the Andes and on the structure of the jet stream, based on airplane glider soundings and schematic diagrams illustrating conditions in Argentina. The c formations as well as wind currents in the several lee waves are illustrated and show photographs and the synoptic conditions shown by Argentine weather maps. The discus of the jet stream is mainly in connection with its influence on currents over the Andes rea *Subject Headings: 1. Lee waves 2. Jet stream 3. Aeronautical meteorology 4. Gl 5. Argentina.—M.R.*

AQUEOUS VAPOR AND HYDROMETEORS

HUMIDITY, EVAPORATION AND EVAPOTRANSPIRATION

See also: Vertical water vapor distribution in stratosphere and upper atmos. (Miller), 5.7-8; Influence of increased air and soil moisture on plant yield (Witte), 5.7-15; Experiments with degree of saturation (Ungeheuer), 5.7-35; Origin of nieve penitente (Liboutry), 5.7-162.

5.7-129

551.571.2:551.588.2

Smith, L. P., **Humidities in the lee of hill masses.** *Meteorological Magazine*, Lon 83(979):1-3, Jan. 1954. fig., 3 tables. MH-BH—Frequency of humidity 90% or mor summer at 3 stations in lee of large hills in England is much less than at nearby stations i open. Mean relative humidity at 15 h is lower. Difference is partly due to lower v pressure. It decreases incidence of potato blight in early summer. *Subject Headings: 1. midity distribution 2. Topographic effects 3. England.—C.E.P.B.*

5.7-130

551.56

Bider, Max, **Der Tagesgang des Dampfdrucks in Basel.** [Diurnal course of water v pressure.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, p. 107-110, publ. 1953. 2 figs., 3 refs. DWB—Diurnal course of vapor pressure is shown for each se separately for sunny, cloudy and all days combined. The means are based on two yea observation. *Subject Headings: 1. Diurnal vapor pressure variations 2. Vapor pres 3. Basel, Switzerland.—A.A.*

5.7-131

551.571.36:551.586:611

Newman, C. C., **High wet-bulb temperatures, Aden, June 1953.** *Meteorological Mago* London, 83(980):59-60, Feb. 1954. 3 tables. MH-BH—Conditions were uncomfort Average wet bulb 81.8°F compared with 80.6°F, 1948-52. Maximum wet bulb exce 88°F twice. Mean relative humidity, June 1953, 73% compared with 67% normal. *St Headings: 1. Humidity extremes 2. Sultriness 3. Aden.—C.E.P.B.*

5.7-132

551.573:551.574.41

Boss, Georg, **Verdunstungs- und Taumessungen in Afrika.** [Evaporation and measurement in Africa.] *Germany. Deutscher Wetterdienst, Berichte*, No. 5, 1953. 14 figs., 3 tables, 5 refs. DWB—Evaporation was measured by means of a Piché evapor

its rate was compared with that of transpiration of *Craterostigma plantagineum* which is injured by complete dehydration. Evaporation was measured at elevations of 2, 20 and 80 m above the ground at Swakopmund, Namib and in farming areas of Southwest Africa; the diurnal and monthly variations are shown graphically and are analyzed in relation to temperature, cloudiness and wind regime. Dew deposition was measured by an especially constructed psychrometer (described with the aid of photographs and a diagram) and the results of measurement made on a living plant are given. The relationship between dew formation and cloudiness along the North African coast (Cyrenaica, Marmarica and Northern Egypt) is discussed. *Subject Headings:* 1. Evaporation measurements 2. Dew measurements 3. Psychrometer 4. Swakopmund, Southwest Africa 5. Namib Desert, Southwest Africa.—*N.D.*

5.7-133

551.573:635

Hesse, W., *Der Einfluss meteorologischer Faktoren auf die Transpiration der Pfefferminze (*Mentha piperita* L.)*. [The influence of meteorological factors on the transpiration of the peppermint.] *Angewandte Meteorologie*, 2(1):14-18, Feb. 1954. 4 figs., 14 refs. *MH-BH, DWB*—Measurements of transpiration were made in the open using plants manured in different ways, and by the drying (Anwelk) method in a climatic chamber (for temperature effect) and in a wind tunnel. It was found that a temperature rise of 10°C more than doubles water need of plants. Transpiration increases with wind speeds up to 3 m/s but decreases above that because plants begin to close their stomata. *Subject Headings:* 1. Plant physiology 2. Evapotranspiration.—*C.E.P.B.*

5.7-134

551.573

Kal'ianov, G. S., *Isparenie isskustvennogo dozhdia pri dozhdevanii v usloviakh Zavolzh'ia*. [Evaporation of artificial rain during sprinkling in the Trans-Volga region.] *U.S.S.R. Ministerstvo Sel'skogo Khoziaistva i Zagotovok, Dostizhenie Nauki i Peredovogo Opyta v Sel'skom Khoziaistve*, No. 5:66-69, May 1953. 2 figs. *DLC*—Up to 30% of the sprinkling water is lost to evaporation in the air. Experimental results are presented showing dependence on temperature, humidity, and wind speed. Diurnal course of evaporation losses is discussed. *Subject Headings:* 1. Evaporation 2. Sprinkling.—*A.A.*

5.7-135

551.573:631

Unger, K., *Zur Abschätzung von Verdunstungsunterschieden verschiedener Pflanzenstände am natürlichen Standort*. [On the estimation of differences of evaporation of different natural plant stands.] *Angewandte Meteorologie*, 2(1):1-4, Feb. 1954. 16 figs., 15 refs., 15 eqs. *MH-BH, DWB*—The evaporation formula of THORNTON and HOLZMANN (*Monthly Weather Review*, 1939) is discussed in the light of PASQUILL's studies (*Roy. Met. Soc., Quart. J.*, 1949) and an expression is derived for the difference of evaporation from two sites. ALBRECHT's method of estimating evaporation from heat exchange is set out and a portable apparatus described. Results are used to compare determinations of evaporation by PASQUILL's and ALBRECHT's methods and to examine effect of wind velocity and air temperature on evaporation from bare soil and grass and from stands of potato, pea and cabbage. Diurnal variations on selected days are compared; there is general agreement with Leistner-Robitzsch psychrometer. *Subject Heading:* 1. Evapotranspiration.—*C.E.P.B.*

CONDENSATION NUCLEI

See also: Evaporation and dew measurements, Africa (Boss), 5.7-132; Condensation trail (Nakashima), 5.7-150; Visibility and liquid content in cloud (Neigurger, others), 5.7-196.

5.7-136

551.574.1

Coulter, Lowell V., *Role of surface forces in the adsorption of water vapor on foreign nuclei*. Boston Univ. Dept. of Chemistry, Contract AF 19(122)-361, Final Report, [1953?] +p. 16 tables, 16 figs., 25 refs. *DWB*—The adsorption isotherms of water on AgI, PbI₂ and BaF₂ have been determined at 0 and 25°C. For comparison purposes the surface areas of the samples employed in the water adsorption measurements, and Ag₂S in addition, have

been determined in the usual manner by nitrogen adsorption at -195.8°C . As is usual found to be the case for ionic solids, the adsorption of water on BaF_2 was found to follow usual type of isotherm for ionic solids which in general display heats and entropies of adsorption of water greater than the corresponding functions for bulk condensation thereby revealing strong ion dipole forces that result in marked orientation (relative to bulk phase) of the molecules of the adsorbed phase. In contrast to this general behavior, the adsorption of water on AgI and PbI_2 is characterized by a smaller heat and a less negative entropy of adsorption than is observed for the condensation of bulk water. Energies of adsorption calculated with the aid of the BET theory likewise indicate a larger heat of adsorption of water on the ionic solid BaF_2 than on the covalently bonded AgI and PbI_2 . *Subject Heading: 1. Adsorption of water vapor.—From author's abstract.*

5.7-137

551.5

*Dufour, Louis and Defay, Raymond, *Sur la formation des germes de condensation et de solidification autour d'un noyau solide insoluble*. [Formation of condensation nuclei and solidification around an insoluble solid nucleus.] *Tellus*, Stockholm, 5(3):293-301, Aug. 1953. 4 figs., 2 tables, 11 refs., 41 eqs. In French; English summary p. 293. **MH-BH-S**—Insoluble nuclei help the formation of water or ice inasmuch as the adhesion-coefficient of water or ice on the solid be positive. If this coefficient is greater than 1 and if the solid nucleus is great enough this effect may be sufficient to render null the free energy of formation of germ and to provoke the condensation or the solidification without germ. These effects can be calculated *a priori*, assuming a certain degree of saturation of the atmospheric water vapor provided the suitable adhesion-coefficient be known. *Subject Headings: 1. Condensation nuclei 2. Condensation processes.—Authors' abstract.*

5.7-138

551.5

Twomey, S. (*Div. of Radiophysics, Commonwealth Sc. and Ind. Res. Org., Australia*), *Identification of individual hygroscopic particles in the atmosphere by a phase-transition method*. *Journal of Applied Physics*, N. Y., 24(9):1099-1102, Sept. 1953. 3 figs., 10 refs. **DWB**—It is shown that in many cases the measurement of the relative humidity at which a hygroscopic particle becomes liquid can be used to establish the chemical composition of the particle. An apparatus is described which produces a stream of air of constant temperature and variable humidity. Using this apparatus the phase-transition point was determined for particles collected on spider webs. These particles were sampled in the Sydney area on the ground and from an aircraft, and it is shown that the measured values of relative humidity for the solid-liquid phase transition agreed with the hypothesis that the hygroscopic particles were composed of sea salt. Direct microscopic observation was used to follow the behaviour of the particles; the technique was capable of dealing with particles down to 10^{-4} cm. *Subject Headings: 1. Hygroscopic nuclei 2. Relative humidity measurement.—Authors' abstract.*

5.7-139

551.574.1:551.5

Würfel, H., *Über den Tagesgang des Kerngehalts der Luft in Berlin-Buch. Ein Beitrag zur Lufthygiene von Grosstadttrandgebieten*. [On the diurnal variation of the nuclei content of air in Berlin-Buch. A contribution to air hygiene of margins of large towns.] *Angewandte Meteorologie*, 1(12):360-372, Dec. 1953. 9 figs., 24 refs. **DLC**—For point on the north edge of Berlin hourly counts on nuclei 7-21 h are studied. Maximum about 11 h followed by a decrease due to vertical exchange. Winds from Berlin have many more nuclei and a more variable frequency distribution than winds from open country. Monthly variations are related to variations of wind direction. Typical diurnal variations are shown for selected days and relations to weather type summarized. *Subject Headings: 1. Atmospheric pollution 2. Nuclei counts 3. Berlin, Germany.—C.E.P.B.*

5.7-140

551.5

Zenker, H., *Brandung und Kondensationskerne an der Ostseeküste*. [Surf and condensation nuclei on the Baltic coast.] *Angewandte Meteorologie*, 1(12):372-375, Dec. 1953. 2 figs., 2 tables, 7 refs. **DLC**—Counts of condensation nuclei at Heringsdorf, on the jetty out to sea and 100 m inland on shore show 1-14% more inland (increasing with wind speed).

sea edge counts were still higher. These differences are due to surf. Max. count 440 nuclei/cc. *Subject Headings:* 1. Saline nuclei 2. Nuclei counts 3. Baltic Coast, Germany.—E.P.B.

5.7-141

551.574.1:551.553:551.591.3

Zenker, H., *Über Beziehungen zwischen Kernzahlen und Windstärke, Sicht und Feuchtigkeit an der deutschen Ostseeküste*. [Relationship between the number of nuclei and wind speed, visibility and humidity on the German Coast of the Baltic.] *Zeitschrift für Meteorologie*, 7(7):209-215, July 1953. 3 figs., table, 11 refs. MH-BH—On the basis of extensive nuclei counts made at Heringsdorf/Usedom, the author examined the relationship between the number of nuclei and 1) wind intensity, 2) visibility, 3) relative humidity for sea breezes, pure sea breezes, pseudo sea breezes and land breezes with local nuclei production and the relationship between nuclei count and precipitation. The mean values of nuclei counts diminished with increasing wind velocity, for all wind types. The relationship between nuclei count and relative humidity is very slight; the nuclei count increased with low relative humidity and the highest counts were during moderate relative humidity. The nuclei content of the atmosphere decreases with precipitation. *Subject Headings:* 1. Condensation nuclei 2. Nuclei counts 3. Wind intensity 4. Visibility 5. Humidity 6. Baltic Coast, Germany.—I.L.D.

FOG

See also: Diminution of fog by forest (Kashiyama, others), 5.7-120; Study on artificial forest (Kyoichi), 5.7-122; Wind force on conifer tree and fog water thereby captured (Yoshida, Kuroiwa), 5.7-193.

5.7-142

551.575

Bouët, Max, *Vagues de brouillard*. [Fog waves.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 1952. p. 114-115, table. DWB—Measurements of waves on the top of a fog layer gave mean periods from 7-35 minutes. *Subject Headings:* 1. Fog waves 2. Switzerland.—A.A.

5.7-143

551.575

Hakodate Marine Observatory, *Report on the marine observation of sea fog in 1952*. Tokyo. *Forest Experiment Station, Bulletin*, No. 64:19-31, Oct. 1953. 9 figs., 21 illus., 4 refs. Japanese; English summary p. 28. DWB—The same program as in preceding year, 1951, was carried out to obtain various meteorological properties relating to the sea fog on board the R.H.S. "Yushio Maru" in July and August 1952, off Kushiro, Hokkaido. Some new devices were employed to measure the lowest layer, especially below 1 meter, above the sea surface by means of thermistors and the lower layer by flying a kytoon. Brief conclusions were described as to fog observation, oceanographical observation, vertical temperature distribution in the layer near the sea surface, turbulent structure, drop-size of fog particles, and the dissolved substances in fog. The turbulent structures were of line spectrum; the drop sizes of fog particles from 10 to 15 μ in diameter prevailed. The concentrations of the dissolved substances of the fog were abundant compared with these of the rain drop. As compared with sea water, fog has different proportion of substances, i.e. the amount of Mg^{++} per unit Cl^- was somewhat less than that of the sea water, whereas those of Ca^{++} and SO_4^{--} were considerably more. *Subject Headings:* 1. Sea fog 2. Sea fog measurement 3. Fog nuclei.—Author's abstract.

5.7-144

551.575:551.551

Imahori, Katsumi, *On the vanishing mechanism of advection fog and the role of turbulence*. (In: Sapporo, Japan. Hokkaido University. Institute of Low Temperature Science, *Studies on fogs in relation to fog-preventing forest*. 1953. p. 35-67. 11 figs., 3 tables, 3 refs., 7 eqs.) MH-BH—The present paper treats theoretically of the various factors contributing to the vanishing mechanism of advection fog in its course over land. The partial differential equations describing the stationary distribution of fog density and air temperature are solved for three simplest cases: 1) Falling drop or gravity effect; 2) diffusion by turbulent motion with or without gravity effect; 3) Temperature effect, with particular

reference to the criterion for the destruction of temperature inversion. The function of wood in preventing fog invasion is reduced in all these cases to the eddy diffusivity of the turbulent air which is characterized by the particular distribution of woods and trees. By the aid of simple models, a working principle is suggested for the most effective planning of the fog preventing forest. *Subject Headings: 1. Advection fog 2. Atmospheric turbulence 3. Fog prevention 4. Fog formation 5. Forest influences.—Author's abstract.*

5.7-145

551.575:551.58

*Ishida, Tamotsu, **General description of the study on fog preventing forest carried out at Akkeshi in 1952.** *Tokyo. Forest Experiment Station, Bulletin*, No. 64:75-81, Oct. 1953. 11 figs., 18 refs. In Japanese; English summary p. 81. DWB—The research members of the Institute of Low Temperature Science, Hokkaido University, made observations on the fog-capturing power of forest and turbulent motion of air inside and in the surroundings of forest, taking part in "the Study on Fog-Preventing Forest" projected by "the Society for Study on Fog Preventing Forest." They carried out their observations at Akkeshi, a sea town on the Pacific coast of the Hokkaido Island, in 1952, after they had performed studies on the same subject at Ochiishi, a sea village several tens of kilometers to the east of Akkeshi, in the previous two years. Fog water content, Austausch coefficient of air, air temperature and wind velocity were measured at various heights at various spots inside and in front of forest. The observational data obtained by these measurements gave by calculation the value of fog-capturing power of the forest. It was found to be in good agreement with the quantity of fog water entering the forest at its top which was determined by capturing fog particles on wire screens set horizontally at the top of forest. The measurements at heights above the ground were made with the aid of wooden towers erected inside and in front of the forest. *Subject Headings: 1. Fog data 2. Fog interception by forest 3. Forest influence 4. Akkeshi, Japan.—Author's abstract.*

5.7-146

551.

*Kinoshita, Seiichi, **Statistics of fogs at Nemuro.** *Tokyo. Forest Experiment Station, Bulletin*, No. 64:82-85, Oct. 1953. 9 figs., 3 refs. In Japanese; English summary p. 85. DWB—The observational data on fogs during the period from 1947 to 1951 obtained by continual observation made by the Nemuro Meteorological Observatory are dealt with statistically. The fog appearing in Nemuro District is mainly the so-called advection fog which comes from over the Pacific Ocean or the Okhotsk Sea carried by wind. Statistics are given on the time of duration, the time of appearance and disappearance of fogs as well as the distribution of foggy hours within a day and the number of foggy hours in each month of the year. It is found, for example, that out of 744 hours of August 200 hours are foggy on an average. In addition, the fogs in the Nemuro district are compared with those in other places (Makurazaki and Iizuka), where advection fog does not appear. *Subject Headings: 1. Advection sea fog 2. Fog data 3. Nemuro, Japan.—Author's abstract.*

5.7-147

551.575.2(49)

Stipaničić, Vladimir, **Magle na Primorju istočne obale Jadrana.** [Fog on the eastern Adriatic coast.] *Mornarički Glasnik*, Split, Yugoslavia, Vol. 1, 1953. 15 p. figs., tables, refs. Abstracted from reprint. DWB—Monthly and seasonal values of mean fog density and probability are presented on the basis of data for 16 stations on the eastern Adriatic coast (1946-1951). Synoptic characteristics of fog situations in general and in the region investigated are described. *Subject Headings: 1. Fog density 2. Dalmatia, Yugoslavia.—*

CONDENSATION TRAILS

See also: Stable subcloud layer and convective updraughts (Bunker, others), 5.7-126;
Visibility and liquid content in cloud (Neiburger, others), 5.7-196.

5.7-148

551.575.3

Atkins, N. J., **Condensation trail rainbow.** *Weather*, 9(1):30, Jan. 1954. fig. MH-B-1
Description with sketch of an arc with rainbow coloring, attributed to a condensation trail.
Subject Heading: 1. Condensation trails.—C.E.P.B.

5.7-149

551.576.11

Mitchell, B. J., **Peculiar contrails.** *Weather*, 9(1):30, Jan. 1954. 2 figs. **MH-BH**—Descriptions of development of high-level contrails from high altitude jet aircraft. *Subject Headings: 1. Condensation trails.*—*C.E.P.B.*

5.7-150

551.576.11:551.574

Nakashima, M., **On the condensation trail.** *Journal of Meteorological Research*, Tokyo, 11:925-932, Feb. 1953. 3 figs., table, 24 refs., 6 eqs. In Japanese; English summary. **MH-BH**—Author passed exhaust from a gasoline engine through a pipe into a cold room and studied artificial cloud droplets with a microscope. Besides water vapor, exhaust contained electrically charged amorphous particles of carbon, PbO and PbBr₂. Random motion in the turbulent airplane stream causes these particles to collide with each other and with water vapor particles. The turbulence acts as a supersonic wave in inducing colloidal mixing. When the air is cooled adiabatically, cloud droplets are formed; at higher temperatures these evaporate and a thin black trail results. *Subject Headings: 1. Condensation trails* *Artificial cloud droplets.*—*C.E.P.B.*

PRECIPITATION

See also: Precip and temp., Wash., D. C., 1952-53 (Abbott), 5.7-58; Solar variation and precip., Albany, N. Y. (Abbott), 5.7-59; Solar variation and precip., Peoria, Ill. (Abbott), 5.7-60.

5.7-151

551.577.2(43)

Aichele, Heinz, **Stau- und Leewirkungen in der Baar.** *Kleinklimatische Niederschlagsstudien.* [Upslope and lee effects in the Baar. Local microclimatic precipitation studies.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen, 1951/1952.* p. 33-38. 11 figs., 14 refs. **DWB**—Rainfall distribution in May-Oct. 1951 studied on the basis of a special rose network (approx. 1 station on 4 km²). The results show mainly the effect of elevation. *Subject Headings: 1. Rainfall distribution 2. Topographic effects 3. Baar, Germany.*—*A.A.*

5.7-152

551.577.2(42)

*Reynolds, G., **Rainfall in the Isle of Man.** *Royal Meteorological Society, Quarterly Journal*, 80(343):78-88, Jan. 1954. 6 figs., 5 tables, refs., 3 eqs. **DWB**—Rainfall records corrected to 1871-1952 are tabulated and maps drawn of mean annual rainfall and annual numbers of windays and wet days. Seven rainfall zones are recognized. Variations of monthly and annual (1-6 yrs) rainfall at Douglas are tabulated. Correlation of annual rainfall with surrounding regions shows closest relations with Anglesey and SW Scotland. *Subject Headings: 1. Rainfall distribution 2. Isle of Man.*—*C.E.P.B.*

5.7-153

551.577.2:551.515.13(42)

Sawyer, J. S., **Rainfall of depressions which move eastward near the English Channel.** *Great Britain. Meteorological Research Committee, M.R.P.*, 816, May 27, 1953. 4 p. 6 figs. Mimeo. **GB-MO**—Rainfall distributions over Britain were drawn for depressions moving E along or near English Channel 1941-50. Average map is shown, also profiles of relation to distance from track, frequency diagrams, etc. Variations in individual depressions are related to track, speed and central pressure, and expressed as a regression equation; 1000-500 mb thickness is also considered. *Subject Headings: 1. Cyclone tracks 2. Precipitation distribution 3. England.*—*C.E.P.B.*

5.7-154

551.577.2:551.515.13(410)

Sawyer, J. S., **The rainfall of depressions which move eastward across Scotland.** *Great Britain. Meteorological Research Committee, M.R.P.*, 843, Dec. 31, 1953. 3 p. 4 figs. Mimeo. **GB-MO**—In continuation of previous M.R.P.'s rainfall charts were drawn for 49 depressions crossing Scotland in 1941-50. Figures show average rainfall, relation to distance from track, percentage giving no rain, and frequency diagrams for selected stations. *Subject Headings: 1. Cyclone tracks 2. Precipitation distribution 3. Scotland.*—*C.E.P.B.*

5.7-155

551.577.2 (68)

*Southern Rhodesia. [Meteorological Dept.], *Average rainfall map of Southern Rhodesia for 30 years ending June 1951*. Drawn and printed at the Surveyor General's Office, Salisbury, S. Rhodesia, 1951. Salisbury, Govt. Print. and Stationery Dept., 1953. 1 sheet 18"×21". DWB—Large multicolored chart showing isohyets for 4 inch range from 12 inches per annum to >48". The extreme heavy precipitation occurs on the eastern edge of S. Rhodesia (adjacent to Portuguese East Africa) whereas the least rainfall occurs within 15 miles to the west (Savanna River Valley) of the area of greatest rainfall. *Subject Headings: 1. Rainfall charts 2. Isohyet charts 3. Southern Rhodesia.*—M.R.

5.7-156

551.577

†Ludwig, Hildegard, *Regionale Typen im Jahresgang der Niederschläge in Vorderindien und ihre Beziehung zu Landschaftsgrundlagen*. [Regional types in the annual precipitation regime in India and their relation to landscape patterns.] *Hamburg. Universität. Abhandlungen aus dem Gebiet der Auslandskunde*, Vol. 57; Ser. C, *Naturwissenschaften*, Vol. 1, 1953. 144 p. numerous tables, graphs, diagr. (fold.), bibliog. p. 144. DWB—An elaborate regional study of rainfall regimes in a score of subareas of India based on records of 30 years or more from hundreds of statistics in the network which was begun in 1876. Average values for each region are plotted by months and also the variation within each region shown in graphs for individual stations. The monsoon type, the transitional type and the late autumn type constitute the major regions. They are broken down into 25 subregions and those into 2 or 3 sub-subregions. Actual mean monthly fall and period of record is given for over 400 stations, and in several cases the 10, 20, and 30 year means are given from 1871-1930 to show variations in long period means as well as spatial variations. *Subject Headings: 1. Regional precipitation types 2. Precipitation variations 3. Precipitation regime 4. India.*—M.R.

5.7-157

551.577.3 (68)

Péczy, György, *A csapadék hullámzása Európában*. [Precipitation fluctuations in Europe.] *Időjárás*, 57(1):26-31, Jan./Feb. 1953. 2 figs., 2 tables. Russian and French summaries p. 26. DLC—Long term periodicities of precipitation amounts, identified in the records of 10 European stations (1851-1940) are statistically analyzed as to their connections with different air mass types. The periodogram analysis reveals that tropical air produces precipitation variations with periodicities of 3, 5, 8, 10 and 14 years; polar air produces precipitation periodicities of 11, 12, 16, 22 and 24 years (attention is called to the close agreement with the sunspot cycle). Similar periodicities are established for maritime and continental air and heterogeneous air masses. Charts showing the geographic distribution of the amplitudes of precipitation variations connected with different types of air masses are presented. *Subject Headings: 1. Precipitation variations 2. Rainfall periodicities 3. Periodogram analysis 4. Europe.*—G.T.

5.7-158

551.577.36 (68)

*Marchetti, Adolfo A. (*Hydromet. Div., Argentina*), *Variability of the rain-fall in the Argentine Republic*. *I.U.G.G. International Association of Scientific Hydrology, Brussels 1951 [Transactions]*, 3:76-80, 1952. maps, tables (some fold.). DWB—Statistical studies based on records from 60 stations during the period 1905-1946. Data for the frequency parameters of annual totals presented in tables. Distribution is almost normal. Variability, standard deviation and amplitude are shown on maps. *Subject Headings: 1. Rainfall frequencies 2. Statistical studies 3. Argentina.*—A.A.

RAIN, SNOW AND HAIL

See also: Permanent model of snow structure (Fuchs), 5.7-33; Impurities in free air (Garrigue), 5.7-72; Electrification of snow (Norinder, Siksna), 5.7-202.

5.7-159

551.577

*Blanchard, Duncan C., *Raindrop size-distribution in Hawaiian rains*. *Journal of Meteorology*, 10(6):457-473, Dec. 1953. 13 figs., 2 tables, 36 refs. Also: *Raindrop size distribution*

on and associated phenomena in Hawaiian rains. Woods Hole Oceanographic Institution, Contract Nonr-798(00) (Nr-085-001), Technical Report, No. 4, Dec. 1952. 21 p. figs., tables, refs. **MH-BH, DWB**—Filter paper samples of drop-size distribution in orographic rains from non-freezing clouds at cloud base or within the cloud gave narrow distributions, largest drops rarely exceeding 2 mm diameter and drops >0.5 mm often exceeding $25,000/\text{m}^3$. These give low values of median drop diameter and radar reflectivity but high liquid-water content. Regression equations for median diameter, water content, radar reflectivity and rate of rain are obtained for different situations. *Subject Headings:* 1. Raindrop size distribution 2. Hawaiian Islands. I. Woods Hole Oceanographic Institution II. Contract Nonr-798(00).—C.E.P.B.

5.7-160

551.578.41

Gold, L. W. and Power, B. A., Dependence of the forms of natural snow crystals on meteorological conditions. *Journal of Meteorology*, 11(1):35-42, Feb. 1954. 7 figs., 4 refs. **MH-BH**—Observations of types of snow crystals during 31 snowfalls at Montreal are compared with temperatures of formation estimated from cloud conditions and synoptic situations. Needles fell from cloud at 0 to -11°C and high surface humidity, dendrites at -7 to -18°C , plates around -20 and -9°C and columns at -16° to -38°C . Observations are plotted individually against height and temperature, and depth of new snow shown. Results are in reasonable agreement with U. NAKAYA's laboratory observations of snow crystal types in relation to temperature and supersaturation. *Subject Headings:* 1. Snow crystals 2. Montreal, Canada.—C.E.P.B.

5.7-161

551.578.46:551.524.7

Diamond, Marvin and Lowry, W. P., Correlation of density of new snow with 700 mb temperature. U. S. Snow, Ice and Permafrost Research Establishment, Research Paper, No. 1, Aug. 1953. 3 p. 2 figs., 4 refs. **DLC**—Air temperatures (from radiosonde ascents) at 700 mb level at Oakland were plotted against density of new snow fallen at the Central Sierra Snow Laboratory 150 miles NW of Oakland for the winter of 1951-1952. A definite relationship is shown with a correlation coefficient of $+0.639$ which is significant at 1% level. No such relationship was shown between 500 mb air temperature and density of new snow. This agrees with results of GOLD and POWERS (1952), NAKAYA (1951) and AUFM KAMPE (1951) who showed that type of snow crystal is a function of temperature, and density of new snow is a function of size and type of snow crystal. Surface temperatures show a poorer relationship to snow density than do 700 mb temperatures though what relation exists is probably due to the interrelationship of 700 mb and surface temperatures. *Subject Headings:* 1. Snow density-temperature relationships 2. Upper air temperature effects on snow density 3. Central Sierra Snow Laboratory, Calif. 4. Oakland, Calif.—M.R.

5.7-162

551.573:551.578.46

Llibouty, Luis (*Centro de Investigaciones de Glaciología, Chile*), El origen de los penitentes. [Origin of nieve penitente.] *Chile. Universidad. Instituto de Geografía, Informaciones Geográficas*, 3(1/2):1-9, June 1953. graphs, 6 tables. Also in: *Journal of Glaciology*, 2(15):331-338, April 1954. **DWB**—A competent discussion of the mechanism of formation of nieve penitente. Geographic location, physical characteristics and climatic requirements are described. After reviewing and rejecting various interpretations of the formation of pinnacled snow fields, proposed by other investigators, the author explains the mechanism of formation as a combined action of sublimation and melting. The physical requirements are: 1) a dew point below 0°C during a prolonged period and 2) strong insolation, while air temperature remains below 0°C . *Subject Headings:* 1. Nieve penitente 2. Chile.—G.T.

5.7-163

551.578.71

Weickmarin, Helmuth, Entstehung und Bekämpfung des Hagels. [Origin and prevention of hail.] *Meteorologische Rundschau*, 6(9/10):175-180, Sept./Oct., 1953. 4 figs., 2 tables, 20 refs. **DLC**—From an analysis of the physical structure of a CuNb it is calculated that a hailstone growing from 1-10 mm diameter must pass through 2700 m cloud of water content 7.5 g/m^3 , taking about 7 min. To grow to 30 mm it must pass through 11,700 m cloud in 19

min or proportionately less for higher water content. A necessary condition is an upward current of at least 9 m/s throughout the cloud. Such extreme conditions cannot be effectively influenced by artificial means. *Subject Heading: 1. Hail formation.—C.E.P.B.*

HYDROMETEOROLOGY

See also: Influence of increased air and soil moisture on plant yield (Witte), 5.7-15.

5.7-164

551.579(43) 551.58:63(43)

†Lossnitzer, H., *Arbeiten des Landeswetterdienstes zu Fragen der Wasserwirtschaft und Landeskultur in Südbaden*. [Works of the State Weather Service on the question of water economy and agriculture in South Baden.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen, 1951/1952.* p. 23-25. DWB—General account of hydrologic activity and list of papers published by collaborators of the weather service on the measurement and distribution of precipitation, including dew and fog precipitation, measurement of soil moisture, percolation and soil evaporation, soil conservation, wind shelter belts and microclimatic surveys. *Subject Headings: 1. Hydrometeorological research 2. Agricultural climatology 3. Baden, Germany.—A.A.*

5.7-165

551.579(5)

*Pramanik, S. K. and Rao, K. N., *Hydrometeorology of the Damodar Catchment*. *Indian Meteorological Dept., Memoirs, 29(6):232-384, 1953.* 5 figs., numerous tables, refs. DWB—The general climatic characteristics of the catchment area, located at 24°N and 86°E are briefly characterized, and a very complete statistical summary of precipitation conditions is presented with main emphasis on the monsoon season, giving normals, standard deviation, frequency distribution, world-wide correlations, etc. Depth-duration and depth-area data are summarized from 1-7 days. The frequency of discharges and the correlation between rainfall and runoff for the monsoon period is computed and forecast formulas for discharges are given. Numerous tables contain standard monthly climatic averages and rainfall data in more detail, giving also catchment means for each day since 1891 (June to Oct.). *Subject Headings: 1. Climatic data 2. Hydrometeorological data 3. Damodar Catchment, India.—A.A.*

5.7-166

551.579:551.588

†Rakhmanov, V. V., *Kak veliko vliianie lesa na vlogooborot v atmosfere?* [How great is the influence of the forest on moisture exchange in the atmosphere?] *Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, 85(1):49-59, Jan./Feb. 1953.* 28 refs. DLC—detailed literature review of the various opinions on the hydrologic effects of forests, based only on literature published in Russian. One group of scientists assumes that forests transpire much more than other plant associations and therefore intensify the turnover of moisture in the atmosphere. RAKHMANOV points out that the possible increase in evapotranspiration is only a small percentage of the whole moisture transport in the atmosphere and presents selection of his own data for 11 catchment areas in the upper regions of the Dnieper, showing a definite increase of runoff with forest percentage. The author concludes that forests conserve moisture, but fails to communicate precipitation, temperature and other climatic data for these areas. *Subject Headings: 1. Forest hydrology 2. Hydrologic cycle 3. Transpiration of forests 4. European U.S.S.R.—A.A.*

5.7-167

551.579:551.588

Rakhmanov, V. V., *Vliianie lesa na stok rek*. [Influence of forests on river runoff.] *Les i Step', Moscow, 9:11-17, 1951.* 2 figs., 3 tables. DLC—The author compares the runoff from 37 catchment areas, divided in 6 groups with similar unspecified climatic and topographic conditions, with the percentage of forests in each area and finds that forests definitely increase the annual runoff. *Subject Headings: 1. Runoff 2. Forest influences 3. European U.S.S.R.—A.A.*

5.7-168

551.579.4:551.588

Ivanov, I. V. and Sapozhnikov, V. I., *K analizu vliianiia zalesennosti basseina na vyse vesennego polovod'ia*. [The analysis of the influence of the forestation of a basin on the level of the spring flood.]

[spring high waters.] *Meteorologiya i Gidrologiya*, No. 6:36-38, 1952. 2 figs., 3 refs. **DLC**—Report on further investigations (see item 3.6-151, June 1952, *MAB*) made on the influence of forested river basins on the flood runoff. The author presents graphs of interrelation between daily runoff and the degree of basin forestation. The maximum decrease of flood runoff was observed in regions with about 60% forest which is equal to about 25% of runoff formed over the forest free basin. The duration of floods is longer in the forested area. *Subject Headings: 1. Forest influences 2. Runoff 3. Spring floods.—N.T.Z.*

5.7-169

551.579.4(44)

§Serra, L., *Météorologie et crues*. [Meteorology and floods.] *La Météorologie*, 4th Ser., No. 28:141-155, Oct./Dec. 1952. 20 figs. (12 synoptic charts). **DWB**—An exhaustive analysis of meteorological data is said to be necessary for the true analysis of causes of floods. As an example, such analysis is presented for a flood on the Durance (tributary joining the Rhône at Avignon). Every flood from 1921-50 is shown graphically (May-June and Oct.-Nov. comprise 95% of cases). Daily synoptic and isohyetal charts, unit hydrographs and mass curves are presented for flood of Sept. 2-6, 1948. Characteristics of the basin which are influential on producing depth-duration area patterns with various types of air flow are also analyzed. *Subject Headings: 1. Flood analysis 2. Flood data 3. Unit hydrographs 4. Durance flood (Sept. 1948) 5. Durance Basin, France.—M.R.*

5.7-170

551.579.5:634.9

Ivanov, L. A., *Gidrologicheskoe znachenie raskhodovaniia vlagi lesom v razlichnykh zonakh evropeiskoi chasti S.S.S.R.* [Hydrological significance of the utilization of moisture by forest in different zones of European U.S.S.R.] *Akademiia Nauk SSSR, Doklady*, 10(4):673-676, June 1, 1953. table, 7 refs. **DLC**—A comparison of the total moisture utilization of forests with total evaporation in the steppe and forest steppe zones indicates that forest consumes less or as much moisture as the grass or field vegetation of nonforested areas within these zones. In the forest zone with surplus moisture (taiga) the moisture utilization of forest needs the total evaporation so that the forest (in particular Fir) aids in the drainage of swamps. *Subject Headings: 1. Forest soil moisture 2. Forest hydrology 3. European U.S.S.R.—I.L.D.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: Water economy and agriculture, S. Baden (Lossnitzer), 5.7-164.

5.7-171

551.58(47)

Selianinov, G. T., *Otvét na vozrazheniia KH. P. Pogosiána*. [Reply to Pogosian's objections.] *Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia*, 85(2):193-194, March/April 1953. 6 refs. **DLC**—Attacking KH. P. POGOSIAN for his criticism published in 1952 (*Ibid.*, v. 84, No. 5), the author accuses him of distorting facts, and shrinking from objective analysis which should have been done on the subject. Many details follow. The main accusations against POGOSIAN are: 1) the disrepute of Soviet climatology, in his first article, and 2) attributing some non-existent merits to climatology in the second (*Meteorologiya i Gidrologiya*, No. 1, 1952). This is followed by a discussion of merits and demerits of several well-known authors, such as A. A. KAMINSKIĬ, A. V. VOZNESENSKIĬ, S. A. SAPOZHNIKOVA, I. A. GOLTSBERG, T. V. POKROVSKAIA and O. A. DROZDOV. In the conclusion the author rejects the accusations made by POGOSIAN concerning the underestimation of the importance of the study of physical laws governing climatological processes and the trend to limit the whole of climatology to satisfying agricultural requirements only. *Subject Headings: 1. Climatology 2. U.S.S.R. 3. I. Pogosián, KH. P.—N.T.Z.*

5.7-172

551.58:06(04)

Thornthwaite, Charles W., *A charter for climatology*. Presidential address at the First Session of the Commission for Climatology, Washington, March 1953. *World Meteorological*

Organization, WMO Bulletin, 2(2):40-46, April 1953. port. Also issued in mimeograph form. 10 p. *World Meteorological Organization CCL-(I)/Doc. 61*, March 12, 1953. DWE In assuming the position of President of the Commission for Climatology at its first meeting under the World Meteorological Organization, THORNTHWAITHE proclaims that climatology has a right to existence as a separate discipline and not as a handmaiden to dynamic or synoptic meteorology as it was under the old IMO between 1930 and 1947. The purpose of the new CCL, he says, is to "Keep abreast of and promote climatological developments both in the scientific and practical fields." Micro- and Topo (Local or Urban) Climatology are stressed as fields for intensive research (field and cartographic). *Subject Headings*: 1. WMO. Commission for Climatology 2. Climatological research 3. Addresses.—M.R.

5.7-173

551.581(81):63

Sioli, Harald, *Betrachtungen über den Begriff der "Fruchtbarkeit" eines Gebietes anhand der Verhältnisse in Böden und Gewässern Amazoniens*. [Remarks on the idea "fertility" of a region, exemplified by conditions in the soil and water of the Amazon.] *Forschungen und Fortschritte*, Berlin, 28(3):65-72, March 1954. 6 figs., 11 refs. DLC—The supposed fruitfulness of Amazonian forest is contradicted by soil and water analyses. In the upland forest are natural campos of no productive capacity. The deciding factor is annual rainfall and length of dry season; soil is only important in marginal cases. The decay of the vegetation is so rapid in the high temperatures and humidities that it is rapidly used up by plants and does not penetrate more than 20 cm into soil. There is no soil reserve and cleared unflooded fields become sterile in 2-3 years. The presence of substances necessary for given crop is also a factor which makes "fertility" a vague term. River water is also very pure, but rich in plankton because of the rapid use of material at water temperatures of 28-32°. *Subject Headings*: 1. Soil fertility 2. Tropical climatology 3. Amazon Valley.—C.E.P.B.

CLIMATE OF PARTICULAR PLACES

See also: *Climatic atlas of Baden-Württemberg* (Deutscher Wetterdienst), 5.7-4.

5.7-174

551.582(43)

*Bleibaum, Irma, *Studien zur Meteorologie der südlichen Rhön*. [Studies of meteorology of southern Rhön.] *Germany. Deutscher Wetterdienst, Berichte*, No. 4, 1953. 15 p. 9 figs., 9 tables, 16 refs. DLC—The Rhön region includes the area between Fulda, Werra and Franconian Saale, which is the southern Rhön. The climatology of this region is described by analyzing the behavior of the individual climatic elements during various weather situations. The author analyzes the distribution of precipitation, temperature means and gradients, relative humidity in relation to the prevailing wind directions and characteristic special weather situations. The role of exposure, slope position, etc. in the formation of local climate and the variability of local climate on mountains and the importance of cloud and sunshine in local climate formation are discussed. Data are given for cloudy days and sunshine duration for 1948-1951. *Subject Headings*: 1. Climatic data 2. Climate of Southern Rhön Region, Germany 3. Rhön Region, Germany.—I.L.D.

5.7-175

551.582.2:629.13

*British West Africa. Meteorological Service, *Frequencies of temperatures and points in specified ranges at airports in Nigeria, Gold Coast and Sierra Leone*. Lagos, Printed by the Survey Dept., 1953. 85 p. mostly tables. DWB—Monthly summaries based on years of observations made at seven airports. Frequencies in 2°F ranges are given for bulb temperature and dew point at four synoptic hours, as well as for the daily maximum and minimum temperatures. *Subject Headings*: 1. Temperature frequencies 2. Dew point frequencies 3. Airways climatic data 4. Airport climatology 4. British West Africa.—M.R.

5.7-176

551.582.2

Busse, Wolfgang, *Das Klima des südlichen Schwarzwaldes und der Baar*. 2. [The climate of the southern Black Forest and the Baar. 2nd part.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen*, 1951/1952. p. 55-82. 6 figs., tables, 7 refs. DWB

udy based on "Klimakunde des Deutschen Reiches" and additional data from health resorts. Monthly averages given for vapor pressure (three times daily and means), relative humidity, sunshine duration, cloudiness, clear and cloudy days, fog frequency, wind speed, cooling power, precipitation amounts and frequency. Part of the data is presented also on maps, separately for winter and summer. *Subject Headings:* 1. Climatic data 2. Climatic charts 3. Climate of the Black Forest, Germany 4. Climate of the Baar, Germany 5. Baar, Germany 6. Black Forest, Germany.—A.A.

5.7-177

551.582.2(410) 551.583.14(410)

Glasspoole, J., *New climatological averages for Great Britain*. *Meteorological Magazine*, London, 83(980):44-48, Feb. 1954. 9 tables, 6 refs. MH-BH—New monthly averages for England and Wales and for Scotland 1921-50 are compared with those for earlier periods. Spring summer and fall were warmer than in 1906-35 (winter no change). There was little change of sunshine compared with 1906-35. Pressure was higher than in 1901-30 in winter and spring, slightly lower in summer and fall. Rainfall 1916-50 was slightly more than in 181-1915. *Subject Headings:* 1. Climatic data 2. Climatic trends 3. Great Britain.—E.P.B.

5.7-178

551.582.2(434.8)

*Langbeck, K., *Die klimatischen Verhältnisse des südlichen Schwarzwaldes, 2. Teil*. [Climatic conditions of the southern Black Forest, Pt. 2.] *Germany. Deutscher Meteorologischer Dienst im Französischen Besatzungsgebiet, Wissenschaftliche Arbeiten*, 2:37-60, 1950. 20 plates, 3 refs. French summary p. 59-60. DLC—In continuation of his climatic study the author presents data for the stations Bonndorf, Grafenhausen, Schluchsee and Lenzkirch and comparative data for these and other nearby stations. The data are monthly values of average, max. and min. temperature, temperature variations, vapor pressure, relative humidity, cloudiness, sunshine duration, number of clear, cloudy, frost, cold, summer and hot days, dew, rime, snow, snow cover, thunderstorms, hail, sleet, fog and storms. The data presented are commented on. *Subject Headings:* 1. Climatic data 2. Climate of the Black Forest, Germany 3. Black Forest, Germany.—G.T.

5.7-179

551.582.2(434.6)

*Trenkle, H. and Rudloff, H., *Monatliche und jährliche Mittelwerte von Niederschlag und Temperatur für das südliche Baden (1871-1950)*. [Monthly and annual mean values of precipitation and temperature for southern Baden (1871-1950).] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen*, 1951/1952. p. 173-184. 8 diagrs. (fold.), tables. WB—Monthly averages given for precipitation and temperature, reduced to the period 1911-1950. Maps show the distribution of precipitation for the year, Jan. and July and the vegetation season (May-July) as well as the distribution of actual annual temperatures. Furthermore, average temperatures are given for each day of the year, as well as pentade averages, both for Karlsruhe and Freiburg. *Subject Headings:* 1. Climatic data 2. Climatic charts 3. Long period records 4. Baden, Germany.—A.A.

5.7-180

551.582.2(763)

*U. S. Weather Bureau, *The climate of Louisiana. Temperature and precipitation normals, 1921-1950 data*. New Orleans, La., July 29, 1953. 12 p. all tables. DWB—For the purpose of this tabulation Louisiana is divided into 9 divisions (shown on map). Data for 50 stations (normal mean temperature, normal monthly precipitation and normal mean maximum and minimum temperature) are summarized by station and by division, and data for additional stations with records too short for the 30 year normal (1921-1950), appended. *Subject Headings:* 1. Climatic data 2. Climatic normals 3. Climate of Louisiana 4. Louisiana.—T.R.

5.7-181

551.582.3:551.585

*Geiger, Rudolf and Pohl, Wolfgang, *Eine neue Wandkarte der Klimagebiete der Erde nach W. Köppens Klassifikation*. [A new wall chart of the climatic regions of the earth according to Köppen's classification.] *Erdkunde*, 8(1):58-61, Feb. 1954. fold. chart, 34

refs. English summary p. 58. **DLC**—Describes a new edition of the colored wall chart published in 1928 by KÖPPEN and GEIGER. The scale is 1:16 million on Winkel's projection. The changes made, and the material on which they are based, are summarized, with a useful bibliography. A simplified black and white version is included. *Subject Headings: 1. Climatic charts 2. Köppen's classification.*—*C.E.P.B.*

CLIMATIC CHANGES

See also: Determination and significance of past temp. changes (Wiseman), 5.7-14; Climatic averages for Gr. Britain (Glasspoole), 5.7-177.

5.7-182

†Buchinskii, I. E., *Izmeniaetsia li klimat Ukrainy za istoricheskoe vremia?* [Has the climate of the Ukraine changed during the historical period?] *Vsesoiuznoe Geograficheskoe Obshchestvo SSSR, Izvestiia*, 85(1):21-30, Jan./Feb. 1953. bibliog. p. 30. **DLC**—A collection of historical remarks on the distribution of forests and steppes and the climate of Ukraine starting with HERODOTUS. The author could not find any indications for a considerable change in climate during the historical period. *Subject Headings: 1. Climatic changes 2. Ukraine, U.S.S.R.*—*A.A.*

5.7-183

Brooks, C. E. P., *The climatic changes of the past thousand years.* *Experientia*, Basel 10(4):153-158, April 15, 1954. 9 figs., 13 refs. French summary p. 158. **DLC**—Various lines of evidence of climatic changes in the temperate Northern Hemisphere since 1000 A.D. indicate: 1) a mild dry period 1000-1250 A.D.; 2) rainier, stormy weather 1250-1400; 3) cool but less stormy 1400-1600; 4) the "Little Ice Age" 1600-1850; 5) progressive warming 1850 to present day. The changes are attributed to changes in the zonal atmospheric circulation and in the distribution of floating sea ice. *Subject Headings: 1. Historical climates 2. Climatic changes.*—*C.E.P.B.*

5.7-184

Öpik, E. J., *The Ice Ages.* *Irish Astronomical Journal*, Armagh, 2:71-84, 1952. 12 tables, 10 refs. **GB-MO**—All evidence, including radiocarbon dating, disproves the "astronomical" theory of Ice Ages, which were due to a general lowering of temperature. Cloudiness was approximately constant at 5 tenths; other theories are dismissed briefly. The basic cause is variable solar radiation resulting from stellar structure. Author's theory (see 5.7-185 below) is summarized. *Subject Heading: 1. Ice Ages.*—*C.E.P.B.*

5.7-185

Schoenberg, E., *Die Ursachen der Eiszeiten.* [The causes of glacial periods.] *Sternwelt*, Munich, 5(5/6):86-91, 1953. **DLC**—Views of E. J. ÖPIK regarding the variability of solar radiation are reviewed. ÖPIK derives such a variability of radiation from the modulation of atomic energy production and gaseous diffusion within the sun, which leads to periodic disturbances. These disturbances (resulting in a decrease of solar radiation) have a period of several hundred million years, thus providing a possible explanation for the origin of glacial periods which recur with a similar periodicity. *Subject Headings: 1. Glacial periods 2. Glacial physics.*—*G.T.*

5.7-186

†Öpik, E. J., *A climatological and astronomical interpretation of the ice ages and of the variations of terrestrial climate.* *Armagh Observatory, Contributions*, No. 9, 1953. 23 figs., 26 tables, 50 refs., 70 eqs. **GB-MO**—Geological changes of climate are attributed to variations of solar radiation, of the scale: Tertiary, 1.09; Present, 1.00; Quaternary glacial minimum, 0.87; Interglacial, 1.02. The basic process is the decrease of hydrogen in the sun by atomic reactions, causing a convective disturbance in which fresh hydrogen is transported inward to the core, the revival of energy output resulting in expansion and decrease of luminosity. One pulse takes about 500,000 years but a prolonged continuous disturbance can cover millions of years (Pliocene-Quaternary). Secondary disturbances in the outer layers

use fluctuations lasting about 100,000 years. The polar ice-sheets are stable until luminosity is below 88% of present, when they expand rapidly, even to equator as in Permo-Carbo-erous. *Subject Headings: 1. Geological climates 2. Solar radiation 3. Astrophysics.—E.P.B.*

MICROCLIMATOLOGY

See: Instruction for making temp. observations at 10 cm height (Netherlands Met. Inst.), 5.7-104.

CLIMATIC CLASSIFICATION

See: Wall chart of climatic regions of the world, according to Köppen's classification (Geiger, Pohl), 5.7-181.

BIOCLIMATOLOGY

See also: High wet bulb temp., Aden (Newman), 5.7-131.

5.7-187 551.586

De Backer, S., *La bioclimatologie*. [Bioclimatology.] *Ciel et Terre*, 69(7/8):187-198, July/Aug. 1953. 6 refs. **MH-BH**—After some general remarks on the scope of bioclimatology as distinguished from climatology, the author takes up in order: the influence of temperature on living organisms; vernalization and dormancy; influence of light; photoperiodism; water cycle; measurement of soil moisture; microclimate of the surface layer of the soil and the effect of climate in modifying organisms or in evolution. *Subject Heading: 1. Bioclimatology.—M.R.*

5.7-188 551.586:551.543.5:551.590.21

Bortels, H., *Zwei einfache Modelle meteorobiologischer Reaktionen in ihren Beziehungen Luftdruckänderungen und zur Solaraktivität*. [Two simple models of meteoro-biological reactions in their relations to pressure changes and solar activity.] *Archiv für Meteorologie, Physik und Bioklimatologie, Ser. B*, 5(2):234-257, 1954. 9 figs., 8 tables, 18 refs. German, English and French summaries p. 234-235. **DLC**—Although there are undoubted correlations between microorganisms and pressure changes, cause is not clear. Relation is better shown by aggregation of colloids. Author investigated effect of pressure changes on precipitation of calcium phosphate by calcium nitrate and potassium phosphate. Sun's rays through thick glass gave streaky precipitate with rising pressure, shading by metal gave flocculation with falling pressure. Little relation to geomagnetism. Flocculation greatest on days of sunspot max. Distilled water with glass dust nuclei kept at -6°C froze more readily on days of rising than of falling pressure. Author concludes that there is some solar agency, varying also with time of day and season, which acts differently in high than in low pressure areas. *Subject Headings: 1. Bioclimatic research 2. Pressure effects 3. Solar influences.—C.E.P.B.*

5.7-189 551.586:612

Hentschel, G., *Physiologische Klimatologie der Harzkurorte*. [Physiological climatology of Harz health resorts.] *Angewandte Meteorologie*, 1(12):353-359, Dec. 1953. 3 tables, 11 refs. **DLC**—To estimate physiological effects of different climates in the Harz, over 100 subjects at Wernigerode were asked their feelings about cooling or warming power of the air on a 14 point scale ranging from unbearably cold to unbearably hot. Susceptibility was found to depend on many physiological factors; important climatic elements were temperature, wind, state of ground and cloudiness, varying with the season. On this basis, at 5 stations cooling power was estimated from 3-daily meteorological observations, 1949-51, and frequencies tabulated. These are classified into 4 stages, corrected for effect of strong winds and diurnal variation analyzed. *Subject Headings: 1. Cooling power 2. Physiological climatology 3. Harz mountains, Germany.—C.E.P.B.*

5.7-190 551.586:63

Selianinov, G. T., *Sostoianie ucheta meteorologicheskikh uslovii v sisteme sel'sko-khoziaistvennogo proizvodstva i neobkhodimoe ego izmenenie*. [Account of meteorological conditions in the system of agricultural production and the necessity for reforming it.] *Vse-*

soiuznoe Geograficheskoe Obshchestvo, Izvestiia, 85(2):185-193, March/April 1953. 7 r.
DLC—An extensive and detailed discussion on how to adjust the present hydrometeorological system to meet adequately the needs of agriculture. The author states many deficiencies and suggests improvements of an organizational and functional nature. The most important deficiencies are: 1) 90% of hydrometeorological stations are located in towns or nearby, 2) the majority of the agricultural experiment stations do not take meteorological observations, 3) less than 10% of the observations made by the hydrometeorological stations are utilized for agricultural purposes, etc. Several types of meteorological stations serving agricultural purposes are suggested, including the thermometer screen invented by the author in the late 20's. Criticism of the teaching programs in meteorology in the agricultural institutes leads to the suggestion to simplify the theoretical course, putting the stress not on weather forecasting but on climatology. In conclusion, it is pointed out that all the proposed changes in the hydrometeorological service could be made from appropriations for maintenance of the synoptic network since this network is not going to justify its existence in the near future. The author also believes that successful prognostication results not from the number of synoptic stations and observation hours but from the right dialectic thinking, talent and the ability of the analyst.
Subject Headings: 1. Agricultural meteorology 2. Climatology 3. Synoptic meteorology 4. Hydrometeorological services 5. U.S.S.R.—*N.T.Z.*

5.7-191

551.586:615.86

Cuba. Instituto Nacional de Hidrología y Climatología y Medicas, *Boletín*. First issue received, Vol. 1, No. 1, Jan. 1953. Director, Dr. Fernando M. Quintero Alvarez. At head of t-p: Republica de Cuba, Ministerio de Salubridad y Asistencia Social. v. 1, no. 1, 48 p., ports., illus., tables, bibliogs. **DWB**—This first issue of a journal to be published regularly by the National Institute of Hydrology and Medical Climatology (balneology) of Cuba contains a picture of the director and editor, and 7 articles on balneology (mostly hydrochemical aspects). **Subject Headings:** 1. Medical climatology 2. Balneology 3. New serial publications 4. Cuba. I. Quintero Alvarez, Fernando M. (ed.).—*M.R.*

ENVIRONMENTAL INFLUENCES

See also: Similarity law of air-flow in connection with forest (Kyoichi), 5.7-121; Humidities in lee of hill masses (Smith), 5.7-129; Fog preventing forest (Ishida), 5.7-145; Influence of forest on moisture exchange in atmos. (Rakhmanov), 5.7-166; Forest influence on river runoff (Rakhmanov), 5.7-167; Influence of forest of basin on level of spring high waters (Ivanov, Sapozhnikov), 5.7-168.

5.7-192

551.588.6(016):551

†Křečmer, Vladimír, *Vliv lesů na srážky*. [Effect of forests on precipitation.] *Meteorologické Zprávy*, Prague, 5(4/5), 1952. 18 p. 5 tables, 216 refs. Abstracted from repr. **MH-BH**—This review and bibliography of forest meteorology includes more than a century of world literature. Brief descriptions of research undertaken and results achieved in numerous phases of forest-precipitation investigation are grouped around three principal headings: 1) effect of forests on the formation, distribution and amount of precipitation, 2) precipitation interception by trees and 3) effect of forests on horizontal precipitation (precipitation in fog) and other hydrometeors. **Subject Headings:** 1. Forest climatology 2. Forest effect on rainfall 3. Reviews 4. Bibliographies.—*G.T.*

5.7-193

551.588.6:551.575.1:551

Yoshida, Zyungo and Kuroiwa, Daisuke, *Wind force on a conifer tree and the quantity of fog water thereby captured*. (In: Sapporo, Japan. Hokkaido Univ. Institute of Temperature Science, *Studies on fogs in relation to fog-preventing forest*. 1953. p. 261-277 figs., 3 tables, 8 refs., 15 eqs.) **MH-BH**. Also in: *Tokyo. Forest Experiment Station Bulletin*, No. 64:63-75, Oct. 1953. **DWB**—In order to determine the amount of water captured by an individual conifer, and hence by a forest, for given wind velocities, the authors established experimentally and theoretically a relationship between wind force and fog water capture using a conifer 2 meters high. Equations are derived for the measurement of the wind force, the determination of the drag coefficient and the evaluation of the drag coefficient of the test tree; the measurement of the quantity of fog water captured by the test tree, the re-

measurement of fog water content. Close agreement is found between theoretical expectations and experimental results. *Subject Headings:* 1. Forest influences 2. Fog interception by forest 3. Water content of fog.—*I.L.D.*

AIR MASS CLIMATOLOGY

5.7-194 551.589(5,6)
Soliman, Kamel Hanna (*Egypt, Met. Dept.*), Air masses and quasistationary fronts in spring and summer over the Middle East. *Mathematical and Physical Society of Egypt, Cairo, Proceedings*, 4(2):15-30, 1950. 10 figs., 8 refs. **DWB**—The main air masses prevailing over the Middle East region in spring and summer were determined, and quasi-stationary fronts are located. The characteristics of excessively hot air masses were determined. These are found to be definitely connected with the seasonal thermal lows of NW Africa, India and the Sudan. The relation of these thermal lows to chains of mountains is noted. Föhn effects are found to play an important role in the dryness and high temperatures of some of these air masses, and in the location of the centres of the thermal lows. It was shown that the inter-tropical convergence zone (I.C.Z.) cannot be applied to the Middle East region (as given by many writers); instead, two frontal zones are found. *Subject Headings:* 1. Air mass climatology 2. Föhn effects 3. Middle East.—*Author's abstract.*

MISCELLANEOUS APPLICATIONS

SOLAR INFLUENCES

See: Simple models of meteorobiological reactions in their relation to pressure and solar activity (Bortels), 5.7-188.

VISIBILITY

See also: Relationship: number of nuclei, wind speed, visibility and humidity, Baltic Coast (Zenker), 5.7-141.

5.7-195 551.591
Douglas, C. A., Some factors affecting the relation between reported visibility and visibility from aircraft. *U. S. National Bureau of Standards, NBS Report*, 2715, Aug. 12, 1953. p. 9 figs., 9 refs., 9 eqs. **DWB**—This report presents an analysis of some of the factors which affect the accuracy of the prediction of the visual guidance received by a pilot landing an aircraft. Consideration is given to such factors as variability of the atmospheric transmittance with time and location, cockpit cutoff, search time, effects of terrestrial backgrounds and the intensity distribution of the lights used when predicting the guidance which the pilot will obtain. Examples of the cumulative effects of these factors are given. *Subject Headings:* 1. Visibility from airplanes 2. Slant visibility.—*Author's abstract.*

5.7-196 551.591.1:551.574.1:551.576.1
Neiburger, Morris; aufm Kampe, H. J. and Weickmann, H. K., Further comments on visibility and liquid content in cloud. *Journal of Meteorology*, 11(1):80-82, Feb. 1954. 6 refs. **H-BH**—Continuation of correspondence on discussion of TRABERT's formula for visual range in cloud by AUFM KAMPE and WEICKMANN (*see items* 5-71, Jan. 1950; 31-277, Sept. 1952 and 5.3-312, March 1954, *MAB*). *Subject Headings:* 1. Visibility 2. Water content of clouds. *C.E.P.B.*

OPTICAL PHENOMENA

See: Possibility of optical soundings in upper atmos. . . (Link), 5.7-51; Study of sodium in twilight (Huntten), 5.7-68.

MIRAGES

5.7-197 551.593.11
Haug, Odd, On the theory of superior mirage. *Meteorologiske Annaler*, Oslo, 3(12):295-300, 1953. 9 figs., 7 refs., 28 eqs. **MH-BH, DWB**—The path of light rays through a strong

upper temperature inversion is considered, so that not only usual superior mirages can be explained, but also cases when more than two reflected images appear. The complicated theory is simplified, discussing selected cases with upright and inverted images and occurrence with more than 4 images. *Subject Headings: 1. Superior mirages 2. Mirage theory.*—A

5.7-198

551.593

Markgraf, H., "Fata Morgana" an der Nordseeküste. ["Fata Morgana" on the North Sea coast.] *Wetterlotse*, 47:200-204, Nov. 1952. fig. DWB—On April 18, 1952 Helgoland was clearly visible sometimes upright, sometimes inverted, from Carolinensiel (53°43'7"48'E), Langeroog (distant 50 km), and other places. The mechanics of reflection of light rays at the upper surface of a cold layer (over the North Sea) are explained. *Subject Headings: 1. Fata Morgana 2. North Sea.*—C.E.P.B.

5.7-199

551.594

Nelson, Robert T., *Weather or not. Mirages and chlorophyll. Better Farming*, So. Bend, Summer 1953. p. 5. DWB—Popular note explaining the elementary principles of reflection and refraction. Attention is called to the fact that the same phenomenon ("reflection of the sun from the surface of the ground") which causes mirages also contributes to the formation of chlorophyll by supplying solar radiation to the under surfaces of plant leaves. *Subject Heading: 1. Mirages.*—G.T.

5.7-200

551.594

Ruck, F. W. M., *Mirages at London Airport. Weather*, 8(1):31-32, Jan. 1953. MH—Account of mirages on runways and soaring of seagulls on thermals. *Subject Headings: 1. Mirages 2. London Airport.*—C.E.P.B.

ELECTRICAL PHENOMENA

See also: *Electric currents in ionosphere* (Baker, Martyn), 5.7-2; *Proceedings of Conference on Radio Met., Austin, Tex., Nov. 1953*, 5.7-3; *Impurities in free air* (Garrigue), 5.7-72; *Sporadic E ionization* (Rawer), 5.7-79.

5.7-201

551.594

Schonland, B. F. J., *Atmospheric electricity*. 2nd ed. London, Methuen and Co., York, J. Wiley, 1953. 95 p. 20 figs., 8 tables, refs., eqs. *Methuen's Monographs on Physics Subjects*. DLC—This little book is clearly written at a high technical level. Chap. 1 describes the origin and measurement of small and large atmospheric ions from radioactive matter in the ground and air and cosmic radiation, and the ionization balance. Chap. 2 covers the fine weather field, potential gradient and variations of fine weather current with height, place and time. It continues with charge on rain and snow, point discharges and maintenance of earth's charge. Chap. 3 takes up the electrification of thunderclouds, measurement of electric field around thunderstorms and distribution of charge within them, and Chap. 4 the structure of lightning discharges and associated field changes. The final chapter deals briefly with the generation of electric charges in clouds and the mechanism of thunderstorm electrification. *Subject Headings: 1. Atmospheric electricity 2. Thunderstorm electricity 3. Textbooks.*—C.E.P.B.

5.7-202

551.594.12:551.57

Norinder, Harald and Siksna, Reinholds (*Inst. of High Tension Research, Univ. of Uppsala*), *On the electrification of snow. Tellus*, Stockholm, 5(3):260-268, Aug. 1953. 8 p. 6 tables, 14 refs. MH-BH—Electrification of snow and related phenomena were investigated by measuring: (1) the charge of snow when pouring it from a vessel into a funnel, (2) the charging of an insulated target when letting snow hit it as well as the charge of the scattered snow, and (3) the charge in air from blowing snow. Specific, basic phenomena were separated. The charge of larger snow particles collected was dependent on the temperature and on the material of the target. The properties of the surfaces seem to be of importance in these phenomena. Enhanced charges of both polarities were measured in air by ion-counters.

ms that these charges are not due to ions, but may be attributed to very small snow particles suspended in air. A complete insight into the whole problem of electrification of snow might be obtained by a systematic consideration of all these specific phenomena. *Subject Headings: 1. Electrical charges on snowflakes 2. Ion counters.*—*Authors' abstract.*

5.7-203

551.594.2

Banerji, S. K., **Electricity of thunderstorms.** *Indian Academy of Sciences, Bangalore, Proceedings, Sec. A*, 35(6):277-280, 1952. 9 refs. Abstracted from reprint. **DLC**—The author reviews some of the literature dealing with the role of thunderstorms in producing variations in the electrical charges at the earth's surface. He discusses the relationship between thunderstorms and the diurnal variation of the electric field of the earth, the process by which falling cloud particles become charged in the pressure of moving ions, the charge distribution in clouds, formation of lightning discharges in clouds and the relationship between electric charges and the electric charge on rain. *Subject Headings: 1. Atmospheric electricity 2. Thunderstorm electricity 3. Lightning discharges 4. Electrical charges on raindrops.*—*L.D.*

5.7-204

551.594.223

Baratoux, M., **Sur une observation de "foudre en boule" faite en avion.** [Observation of ball lightning from an airplane.] *La Météorologie*, 4th Ser., No. 28:164-166, Oct./Dec. 1952. 2 figs. **DWB**—Flying in a thundery situation (in a Constellation) at 3400 m altitude near Cairo Airport, the author and RENÉ GUYOMARD both witnessed a ball of fire (orange yellow at the center and gray violet outside, slightly spiral in form and rotating and about the size of a tennis ball) which followed along with the same speed as the plane, but not touching it, and finally exploded like a gun. Before it was seen the plane was subjected to a thud followed by a bumping sound like that produced by a log bumping along the side of a boat at anchor in stream. *Subject Headings: 1. Ball lightning 2. Cairo, Egypt.*—*M.R.*

5.7-205

551.594.223

Nauer, Herbert, **Modellversuche zum Kugelblitz.** [Model research on ball lightning.] *Zeitschrift für angewandte Physik*, 5(12):441-450, Dec. 1953. 4 figs., 15 refs. **DLC**—Earlier theories of ball lightning are investigated experimentally and found to be untenable, and a new theory is based on an observation by H. HERTZ in 1883 that every strong initial discharge creates a cloud which is luminous for a measurable time. Diffuse burning of dilute mixtures of various gases in air below the normal flash point was examined experimentally as it offers similarities to the phenomena of ball lightning. Combustible gases, especially methane, are present in nature and ball lightning may be due to them. It is not the same as pearl necklace lightning. *Subject Headings: 1. Ball lightning 2. Model experiments.*—*C.E.P.B.*

5.7-206

551.594.223

Petersen, Helge, **Ball lightning.** *Weather*, 9(3):73, March 1954. photo. **MH-BH**—Photo shows track of slow-moving ball lightning (disturbed by movement of camera) at Copenhagen during a thunderstorm. The ball was finally carried by a downdraft down a chimney and exploded in the fireplace. *Subject Heading: 1. Ball lightning.*—*C.E.P.B.*

5.7-207

551.594.25

*Banerji, S. K. (*Coll. of Engr. and Tech., Bengal, Jadavpur*) and Lele, S. R., **Electric charges on rain-drops.** *National Institute of Sciences of India, Delhi, Proceedings*, 18(2):93-124, March/April 1952. 10 tables, 11 figs., bibliog. p. 124. Abstracted from reprint. **DWB**—An equipment for recording charge on individual drops of rain was developed and experiments are discussed, presenting numerous data for thunderstorm raindrops (mean charge ~ 0.05 e.s.u. and nonthunderstorm rain 10.02 e.s.u.) associated with intense and weak negative gradient or with an increase in the positive potential gradient. The results are compared with current theories proposed by GOTT, SIMPSON, FINDEISEN, LANGMUIR and others. Initially, cloud particles seem to develop charge as colloidal particules and afterwards the charge increases by breaking of drops (Simpson process). *Subject Headings: 1. Raindrop charge recorders 2. Electrical charges on raindrops 3. Poona, India.*—*A.A.*

ASTROPHYSICS

5.7-208

523.7

Arsent'ev, V. V., *Novyi radioteleskop*. [A new radiotelescope.] *Priroda*, Moscow, N 8:90-91, Aug. 1953. **DLC**—Popular discussion on the advantages of radiotelescopes in comparison with the usual one, and a general outline of radio-methods used in modern astronomy. The design of a great radioscope which will be installed by the Radioastronomical Observatory in Jodrell Bank, Cheshire, Eng. (with reference to *British Astronomical Association, Circular* No. 333; *L'Astronomie*, May 1952) is mentioned and its diameter given as 76.25 m. The following remarks on some recent achievements of Russian astronomers and astrophysicists: Physical conditions of various parts of solar corona have been studied by investigating the solar radio-radiation of various wave length. The first radiophysical observations of complete solar eclipse on March 20, 1947 in Brazil made by soviet physicists S. E. KHAÏKIN and B. M. CHIKHACHEV proved the coronal origin of the solar radio-radiation in one meter range of wave lengths. Radioastronomy provided much information about the structure of galaxies and particularly about the distribution of interstellar hydrogen. However, it is concluded that the fundamental factor providing for successful solution of astronomical problems is not the size of the instrument used, but the right method of investigating and its proper direction. **Subject Headings:** 1. Radiotelescopes 2. Astrophysics.—N.T.Z.

5.7-209

523.7

Babcock, Horace W. (*Mt. Wilson and Palomar Observatories; Carnegie Institution of Washington; Calif. Inst. of Technology*), *The solar magnetograph*. *Astrophysical Journal*, Chicago, Ill., 118(3):387-396, Nov. 1953. 8 figs., 11 refs. **DLC**—A new instrument for measuring and recording weak magnetic fields on the surface of the sun has been developed for use with the 150-foot solar telescope and 75-foot spectrograph of the Hale Solar Laboratory. Principal features include: a superior grating of high resolving power for use in the fifth-order spectrum; an electro-optic analyzer for polarization; a double-slit detector for the longitudinal Zeeman effect; and a self-synchronous system by which the disk of the sun is scanned in a raster of parallel traces, the results as to magnetic intensity and polarity being presented automatically on the screen of a cathode-ray tube and recorded by a camera. The noise level (about 0.1 gauss) is such that fields of the order of 1 gauss can be recorded readily. The method of calibration is described, and the possibility is pointed out of using the instrument with a slight optical modification, for studying small Doppler shifts in the sun's atmosphere. **Subject Headings:** 1. Magnetic field measurement 2. Magnetographs.—Author's abstract.

5.7-210

523.7

International Council of Scientific Unions. Mixed Commission for the Study of Solar and Terrestrial Relationships, Rome, Sept. 3, 1952. *Procès-Verbal [and] Communication [1953?]* 35 p. diagrs., refs. In French and English. **DWB**—This report contains the transactions of the Rome meeting, recommendations and 11 papers (abstracted separately by R. BUREAU, A. and É. VASSY, NICOLET, SIMPSON, DOBSON, VEGARD and others. **Subject Headings:** 1. Solar-terrestrial relationships 2. Conference reports.—M.R.

5.7-211

523.7

Kiepenheuer, K. O., *Ist das allgemeine Magnetfeld der Sonne messbar?* [Is the general magnetic field of the sun measurable?] *Zeitschrift für Naturforschung*, 8a(4):225-227, April 1953. 8 refs., 3 eqs. **DLC**—A discussion of the conditions for maintenance of a magnetic field in the sun leads to the conclusion that an internal general solar field can only be observed through hydrogen convection cells at the surface, and even in the most favorable case strongly distorted. **Subject Heading:** 1. Solar physics.—C.E.P.B.

5.7-212

523.7:53

Lindblad, Bertil (*Stockholm Observatory, Sweden*), *The luminous surface and atmosphere of the sun*. *Smithsonian Institution, Annual Report*, 1950:173-182, 1951. 6 figs., 3 plates. **DWB**—Author introduces his lecture by summing up basic knowledge concerning the sun's energy and atmosphere. He then gives an account of photometric observation of the sun's spectrum during solar eclipses. It is pointed out that the distance between two points on

th can be calculated by means of cinematographic determination of the time of contact between sun and moon as observed from the points in question during an eclipse. June 30, 54, is indicated as the next opportunity for such measurement in relation to Europe and America. Other results obtained through photometric measurement are mentioned and presented in photos and graphs. *Subject Headings: 1. Solar atmosphere 2. Solar activity 3. Solar eclipses 4. Photometry.—G.T.*

5.7-213 523.7
 Michard, Raymond (*Astrophys. Inst. Paris*), **Contribution à l'étude physique de la photosphère et des taches solaires.** [Contribution to the physical study of the photosphere and sunspots.] *Annales d'Astrophysique*, Paris, 16(4):217-286, July/Aug. 1953. 34 figs., 10 tables, 61 refs. **MH-BH**—1. The continuous solar spectrum is investigated by means of the semi-empirical methods previously employed by CHALONGE and KOURGANOFF and by PEYRAUX. 2. Spectra of some thirty sunspots were obtained between λ 3200 and λ 6700 Å. The relation I'/I between intensity at the sunspot center and the adjoining photosphere was measured for six wavelengths of the continuous spectrum. The measured values were very carefully corrected on account of errors resulting from diffusion and from visual fluctuation. Such errors show a rapid increase from red to ultraviolet. 3. From the author's observations and those of other authors, a table of physical conditions in a major sunspot is derived. *Subject heading: 1. Solar physics.—From author's abstract (trans.).*

5.7-214 523.72:538.56
 Christiansen, W. N. and Warburton, J. A., **The distribution of radio brightness over the solar disk at a wavelength of 21 centimeters. 1. A new highly directional aerial system.** *Australian Journal of Physics*, 6(2):190-202, June 1953. 6 figs., 2 refs., plate. **DWB**—A new aerial system of very high resolving power has been designed for use in determining the distribution of radio brightness across the solar disk at a wavelength of 21 cm. Thirty-two aerials with paraboloidal reflections are evenly spaced in an east-west direction over a distance of about 700 ft and are connected by a branching system of balanced open-wire transmission lines to a receiver. The aerial system produces multiple beams each 3' of arc wide and spaced 7° apart. The rotation of the Earth causes one after another of the aerial beams to scan the disk of the Sun. The record obtained from the radio receiver gives a one-dimensional brightness distribution over the solar disk. *Subject Heading: 1. Solar radio brightness.—Author's abstract.*

5.7-215 523.72:621.396
 Hatanaka, Takeo (*Cornell Univ.*) and Moriyama, Fumio (*Tokyo Astronomical Observatory*), **Note on the long period variation in the radio frequency radiation from the quiet sun.** Cornell University. School of Electrical Engineering, Contract AF 19(604-73), Scientific Report, No. 1, Dec. 1, 1952. 12 p. 2 figs., eqs. **DWB**—The apparent temperature of the quiet sun measured at radio frequencies is calculated with varying value of the electron density in the corona and chromosphere to see how it changes throughout a sunspot cycle. The electron temperature in the chromosphere is assumed to increase exponentially with height until it reaches a constant value in the corona. The electron density in the corona is supposed to vary by a factor of two during a whole sunspot cycle without any change in the form, but in the chromosphere is assumed to vary in two different manners. The observations by COVINGTON at 10.7 cm during 5 years seem to fit the calculated curve, while the decrement of the apparent temperature as given by CHRISTIANSEN and HINDMAN on five frequencies between two periods seems not so well fitted, although the existence of a maximum of the variation of the apparent temperature at a frequency of about 1000 Mc/s is confirmed both from theory and observation. *Subject Headings: 1. Radio frequency radiation 2. Solar temperature 3. Chromosphere. 4. Corona. 5. Sunspot cycle.* Cornell University. School of Electrical Engineering II. Contract AF 19(604-73).—*Authors' abstract.*

5.7-216 523.72
 Reichel, Max, **Zur Theorie der Spektroheliogramme.** [On the theory of the spectroheliogram.] *Zeitschrift für Astrophysik*, 33(2):79-114, 1953. 7 figs., 55 refs., 29 eqs. **DLC**—

The spectroheliograph apparatus at Meudon, Paris, is described and the results summarized. Some new information about the structure of the sun's atmosphere is set out. *Subject Heading: 1. Solar atmosphere.—C.E.P.B.*

5.7-217

523

Vitense, Erika, **Die Wasserstoffkonvektionszone der Sonne.** [The hydrogen convection zone of the sun.] *Zeitschrift für Astrophysik*, 32(3):135-164, 1953. 11 figs., 22 refs., 10 refs. in German. **DLC**—Temperature stratification in convection zone of the sun is calculated on assumption that convective and radiant energy transport together equal σT_e^4 (T_e , effective temperature). Next is a very deep transition zone with stratification between this and adiabatic. It becomes practically adiabatic at $\log P_0 = 8$ (P_0 , gas pressure), a depth at which observable phenomena have no further effect. Granulation is due to turbulence elements rising from the convection zone, reaching its boundary with excess velocity and high temperature, enabling them to penetrate the radiation equilibrium zone. *Subject Heading: 1. Solar physics.—C.E.P.B.*

5.7-218

523

Binge, Hans-Jost, **Vergleich solarer Erscheinungen mit der Veränderlichkeit von Sternen in Gasnebeln.** [Comparison of solar phenomena with the variability of stars in gaseous nebulae.] *Zeitschrift für Naturforschung*, 7a(6):440-444, June 1952. 5 figs., refs. **DLC**—The variability of the sun due to sunspot activity resembles that of the RW Aurigae stars of small amplitude, brightness greatest at spot minimum. Spot formation is attributed to whirls in the gaseous nebula surrounding the sun wandering into the corona, but this does not explain the 11-year period or reversal of polarity. According to HIMPEL's theory that solar flares were caused by increased nebular density, there should at the same time have been increased corpuscle radiation, which accounts for the rapid evolution of new species. *Subject Heading: 1. Sunspots.—C.E.P.B.*

5.7-219

523.74:

Bouška, Jiří, **Sur l'effet terrestre apparent de l'activité solaire.** [On the apparent terrestrial effect of solar activity.] *Académie des Sciences, Paris, Comptes Rendus*, 232(18):1581-1584, April 30, 1951. table, 2 refs. **DWB**—In 1907 Mrs. MAUNDER published a classic work which attributed the preponderance of sunspots in the Eastern Hemisphere to a terrestrial influence. The statistics shown by the author for formation and decay of sunspots and relative Wolf numbers (1935-1949), chromospheric eruptions, protuberances and coronal emissions do not show any significant asymmetry, although there is some variation with variations in solar activity. *Subject Headings: 1. Terrestrial effects 2. Solar activity.—M.R.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON GLOBAL SOLAR RADIATION

By: *Isadore L. Dordick*

EXPLANATORY NOTE

The aim of this bibliography is to list available data on global solar radiation for use in calculating radiation balance of the atmosphere and in determining heat load due to radiant energy for climatological and applied meteorological studies.

Published climatological data on global solar radiation are not very plentiful. Not all weather services make continuous and complete observations of solar radiation. Often only actinometric measurements of solar radiation intensity are carried out. Occasionally the observations of global solar radiation are either not published at all or published irregularly.

This bibliography lists available published sources of data on global solar radiation. In this introduction, however, we shall call attention to sources of data which are available but not published, or which are about to be published.

In Argentina observations of global solar radiation have been made for more than a decade at the Observatorio Central, Buenos Aires, and at the Observatorio Geofísico de Pilar. More recently a network of nine radiation stations has been established. None of the radiation data has been published.

Australia began the establishment of a network of seven radiation stations in 1950. All were in operation by 1953, but publication of observations has not yet begun.

In Israel solar radiation observations are being made at the Hebrew Institute of Technology, Haifa.

New Zealand is planning a skeleton network of radiation stations to record global solar radiation.

Finally, in Norway observations of global solar radiation are being conducted by the Norwegian Meteorological Institute at four stations; and by the Geophysical Institute of the University of Bergen which has established nine stations in order to study the solar radiation in southern Norway. Up to now no observations have been published.

The **Geographic Outline** is a guide to the specific areas for which global radiation data are available. The Subject Index on p. 874 should be consulted for a more detailed subject breakdown, e.g., Solar Radiation intensity. Spectral distribution of solar radiation, Ultraviolet radiation, and so on for reference to the specific instruments used, e.g., Ångström pyrheliometer, Gorczyński solariograph and Robitzsch actinograph.

The author wishes to thank Mr. Billy M. Lewis, U. S. Weather Bureau, who kindly placed his bibliographical material on solar radiation at the disposal of *Meteorological Abstracts and Bibliography*.

GEOGRAPHICAL OUTLINE

ARCTIC REGION, 5G-23, -33

Soviet Arctic, 5G-61, -65

Spitsbergen

Saachsen's Plateau, 5G-55

Sveanor, see Sweden

NORTH AMERICA

Alaska, 5G-104, -114

Canada, 5G-104, -114

Greenland

Mt. Evans, 5G-23

Mexico

Tacubaya, 5G-89

United States, 5G-67, -73, -99, -100, -101,

-104, -107, -114

Arizona

Tucson, 5G-26

California

Fresno, 5G-50

La Jolla, 5G-15, -50

Pasadena, 5G-15

District of Columbia, 5G-3, -50, -60

Florida

Gainesville, 5G-50

Miami, 5G-50

Illinois

Chicago, 5G-3

Louisiana

New Orleans, 5G-40, -50, -81

Massachusetts

Blue Hill, 5G-38, -48, -60, -121

Michigan

East Lansing, 5G-106, -107

- Nebraska
Lincoln, 5G-3, -60
- Tennessee
Oak Ridge, 5G-129
- Wisconsin
Madison, 5G-3, -60
- SOUTH AMERICA**
Brazil, 5G-34
- EUROPE**
Alps, 5G-124
- Austria**, 5G-118
Kanzelhöhe, 5G-27
Oberengadin, 5G-7
Stolzalpe, Austrian Alps, 5G-16, -18
Traunkirchen, 5G-37
Vienna, 5G-84
- British Isles**
England
Kew Observatory, 5G-59, -113
London, 5G-55
Rothamsted, 5G-55
Ireland, 5G-93
- Czechoslovakia**
Podersam, 5G-126
- Danzig**, 5G-76
- Finland**
Helsinki, 5G-6, -20, -24, -32, -41 to -43, -49, -51, -55, -79
- France**
French Riviera, 5G-46
Nice, 5G-47, -51, -55
Paris, 5G-4, -11, -51, -55
- Germany**
Aachen, 5G-58
Allgäu, 5G-68
Bochum, 5G-97, -98
Greifswald, 5G-123, -128
Harz Mountains, 5G-39
Höfchen, 5G-97
Karlsruhe, 5G-21
Nebelhorn, 5G-96
Obersdorf, 5G-96
Potsdam, 5G-14, -58, -78, -80, -122, -127
Wahnsdorf, 5G-58
Warnemünde, 5G-108
Zugspitze, 5G-13
- Greece**
Athens, 5G-120
- Italy**
Canegliano, 5G-51
Venice, 5G-35
- Netherlands**
Arnhem, 5G-86
Wageningen, 5G-17, -72, -75, -86
- Norway**
Bergen, 5G-88, -125
Olden Nordfjord, 5G-83
Os, 5G-102
- Poland**
Danzig, 5G-76
Warsaw, 5G-51, -55
Zabie, 5G-54
- Portugal**, 5G-90
Coimbra, 5G-66
- Sweden**
Abisko, 5G-44
Stockholm, 5G-9, -62, -117
Sveanor, 5G-36, 1
Uppsala, 5G-22
- Switzerland**
Arosa, 5G-4
Davos, 5G-1, -12, -19, -82, -103
Jungfrauoch, 5G-69
Locarno-Monti, 5G-74, -103
Tessin, 5G-45
Zurich, 5G-77, -103
- Trieste**, 5G-70
- U.S.S.R.**, 5G-87
Leningrad, 5G-55
Mt. Elbrus, 5G-29
Pavlovsk, 5G-85, -111
Petrovskoe-Razumovskoe, 5G-25
Slutsk, 5G-25, -51, -57
Smolensk, 5G-28
Sverdlovsk, 5G-57
Tiflis, 5G-25, -94
- ASIA**
China
Dairen, 5G-110
- India**
Poona, 5G-30, -64
- Japan**, 5G-105, -109, -112
- Korea**, 5G-110
- Sakhalin**, U.S.S.R., 5G-110
- AFRICA**
Egypt
Aswan, 5G-31
Helwan, 5G-2
- French West Africa**
Dakar, 5G-130
- Sahara Desert**, 5G-115
- South Africa**, 5G-71, -91, -116, -119
- Tunisia**
Ariana, 5G-10
- AUSTRALASIA**
Java
Batavia, 5G-92
- Samoa**
Apia, 5G-8
- OCEANS, SEAS AND ISLANDS**
Atlantic Ocean, 5G-34
Caribbean Sea
Puerto Rico, 5G-110
- Indian Ocean**, 5G-53
- Mediterranean Sea**, 5G-53
- Pacific Ocean**
Hawaii, 5G-110, -114
Ponape, 5G-110
Saipan, 5G-110
South China Sea, 5G-53
- Red Sea**, 5G-53
- ANTARCTICA**
Stonington, Island, 5G-95

BIBLIOGRAPHY ON GLOBAL SOLAR RADIATION

1919

- 5G-1 551.521.12(494) 551.521.31(494)
 *Dorno, Carl, *Himmelschelligkeit, Himmelspolarisation und Sonnenintensität in Davos 1911-1918*. [Sky brightness, sky polarization and solar intensity in Davos, 1911-1918.] Berlin. *Preussisches Meteorologisches Institut, Abhandlungen*, v. 6, 1919. 290 p. 68 tables, 26 plates. *Öffentlichungen*, No. 303. DWB—Tables include mean monthly heat intensities as a function of solar elevation in gm cal/min/cm² (normal values) and daily and hourly variations of mean heat intensities on the 15th of each month (normal values) in gm cal/min/cm²; total intensity of solar radiation in 1909-1918 (according to percent deviation from normal values) and total intensity of solar radiation as a function of air masses. Data on mean monthly green blue, blue, blue violet, violet + ultraviolet and ultraviolet intensities of solar radiation as a function of solar elevation included. *Subject Headings*: 1. Global radiation data 2. Solar radiation intensity 3. Short wave radiation 4. Davos, Switzerland.

1922

- 5G-2 551.521.12(62)
 *Knox-Shaw, H., *Observations of solar radiation, 1915-1921*. Helwan, Egypt. *Observatory, Melin*, No. 23:238-256, [1922]. DLC, NN—Observations on total radiation were made nearly every day with an Ångström pyrheliometer; also radiation received through a green glass screen whose maximum transmission is at wave length 0.526μ and a water cell in front of the pyrheliometer. For each day of observation for each of the years 1915-1921 the author gives the values for the radiation received outside the earth's surface reduced to mean solar distance, the transmission coefficient and similar values for the observations made through a green screen in 1915. *Subject Headings*: 1. Diurnal global radiation 2. Atmospheric transmission coefficient 3. Helwan, Egypt.

1924

- 5G-3 551.521.12 - 551.521.3(753, 775, 782, 773)
 *Kimball, Herbert H., *Solar and sky radiation measurements*. *Monthly Weather Review*, (1):42, Jan. 1924. 2 tables. DWB—Tables contain data on direct solar radiation (morning and afternoon values) during Jan. 1924 obtained at Washington, D. C., Madison, Wisc., and Lincoln, Nebr., by means of a Marvin pyrheliometer and data on solar and sky radiation (average daily radiation) received on a horizontal surface during Jan. 1924 at Chicago, Washington, Madison and Lincoln, obtained by means of a thermoelectric recording pyrheliometer and a Callender recording pyrheliometer. *Subject Headings*: 1. Diurnal global radiation 2. Global radiation data 3. Chicago, 4. Washington, D. C. 5. Madison, Wisc. 6. Lincoln, Nebr.

1925

- 5G-4 551.521.12(44)
 *Brazier, C.-E., *Observations actinométriques faites au Parc Saint-Maur 1915-1923*. [Actinometric observations made at Parc Saint-Maur 1915-1923.] Paris. *Université. Institut de Physique Globe, Annales*, 3:127-137, 1925. tables. DLC—Data include observations made of the amount of total solar radiation received upon a surface normal to the sun's rays expressed in cal/cm²/min. Observations were made at irregular intervals during every month for the period 1915-1923. *Subject Headings*: 1. Global radiation data 2. Paris, France.

1926

- 5G-5 551.521(494)
 *Götz, F. W. Paul, *Strahlungsklima von Arosa*. [Radiation climate of Arosa.] Berlin, Julius Springer, 1926. 110 p. 31 figs., 69 tables. DLC—The radiation data include: intensity of total radiation as a function of solar elevation and of time of day; intensity of red and infrared solar radiation as a function of solar elevation and of time of day; intensity of green blue solar radiation (<600μ) as a function of solar elevation; heat totals of solar radiation upon a horizontal surface on clear days, daily heat totals on the surface of a cube. All the values are given in monthly means and expressed in gm cal. *Subject Headings*: 1. Diurnal global radiation 2. Global radiation data 3. Solar radiation intensity 4. Short wave radiation 5. Arosa, Switzerland.

- 5G-6 551.521(471) 551.501.1:551.508.21/5
 *Lunelund, Harald, *Über die Wärme- und Lichtbestrahlung in Finland*. [Heat and light radiation in Finland.] *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae*, 2(11), 1923-1926. 47 p. 9 figs., 25 tables, refs. to Pt. I, p. 98-99; to Pt. II, p. 146. DLC—Pt. I, Heat radiation, contains a description of the apparatus and methods for measuring radiation

and the following data: intensity measurements for 1922-1923 including relationship between intensity and solar elevation, total radiation in Helsinki, daily variation, etc.; actual heat totals for 1923, theoretically possible heat totals in Helsinki, red heat radiation and reflection of heat radiation from a water surface. Pt. II is a discussion of brightness radiation (sun and sky radiation) and its components, diffuse and solar radiation and the photochemical intensity of daylight radiation. Data are given daily, variation of total brightness, the influence of cloudiness, brightness radiation of the sun, light totals, photochemical intensity, solar elevation, etc. *Subject Headings: 1. Diurnal global radiation 2. Global radiation data 3. Radiation intensity 4. Diffuse radiation 5. Helsinki, Finland.*

1927

5G-7

551.521.12

*Dorno, Carl W. M., *Grundzüge des Klimas von Muottas Muraigl (Oberengadin)*. 1. meteorologisch-physikalisch-physiologische Studie. [Basic characteristics of the climate of Muottas Muraigl (Oberengadin). A meteorological-physical-physiological study.] Braunschweig, Vieweg und Sohn, 1927. 177 p. 11 figs., 41 tables. DWB—In this detailed discussion of physical and physiological climatology of Muottas-Muraigl the sections on solar radiation and radiation contain the following data: total intensity of solar radiation as a function of time of day; solar elevation, intensity of red and infrared solar components of solar radiation as a function of time of day and solar elevation, illumination intensity of solar radiation upon a surface normal to incident rays as a function of time of day and solar altitude; ultraviolet intensity of solar radiation as a function of time of day and solar elevation; intensities and hourly totals of short wave ($<3\mu$) radiation of sun and sky and of sky alone upon a horizontal surface as a function of time of day; ultraviolet intensity (1) of sun and sky radiation and of sky alone upon a horizontal surface as a function of time of day and (2) of sun and sky radiation as a function of solar elevation. *Subject Headings: 1. Global radiation data 2. Solar radiation intensity 3. Short wave radiation 4. Oberengadin, Austria.*

5G-8

551.521.12

*Thomson, Andrew, *Solar radiation observations at Apia, Samoa*. *Monthly Weather Review* 55(6):266-267, June 1927. 2 figs., 2 tables, 4 refs. DWB—Solar radiation was measured by means of a Gorczyński pyrheliometer in 1927. The measured radiation intensity, intensity reduced to mean distance from earth to sun expressed in gm cal/m/cm² and atmospheric transmission for air masses ranging from 1.1 to 5.0 averaged for the day (May-Aug.), equinoctial (March-April), and wet seasons (Nov.-Feb.) and for the year are given in a table. Also hourly values of the moisture content on bright days (absolute humidity and moisture content) are given in the other tables. Graphs showing the variation of solar radiation intensity and the variation of the atmospheric transmission coefficient with different air masses for the given seasons are included. *Subject Headings: 1. Solar radiation intensity 2. Global radiation data 3. Atmospheric transmission coefficient 4. Apia, Samoa.*

1928

5G-9

551.521.12

*Ångström, Anders, *Recording solar radiation. A study of the radiation climate of the surroundings of Stockholm*. Sweden. *Meteorologisk-Hydrologisk Anstalt, Meddelanden*, 4(3), 1928. 36 p. illus., 2 plates, tables, ref. DWB—This study is concerned primarily with the quantity of radiation reaching the earth from the sun and sky. The measurements reported include: monthly radiation income during the period July 1922-Dec. 1927, maxima and minima of daily radiation income observed during the interval 1922-1927, total radiation from sun and sky 1905-1906 computed from hours of sunshine, monthly radiation sums for clear sky and horizontal surface, monthly values of total radiation, direct solar radiation and diffuse solar radiation, recorded minimum values of total radiation April-Dec. 1926 and Jan.-Aug. 1927, and total radiation from sun and sky upon a horizontal surface (daily and hourly) for the period April 1926-Aug. 1927 in cal/cm²/min. *Subject Headings: 1. Diurnal global radiation 2. Global radiation data 3. Diffuse radiation 4. Direct solar radiation 5. Stockholm, Sweden.*

5G-10

551.521.12

*Amiable, J.-V., *Valeurs de l'intensité du rayonnement solaire obtenues en 1924, 1925, 1926 et 1927 à l'Ariana pour l'incidence normale*. [Values of the intensity of solar radiation obtained in 1924, 1925, 1926 and 1927 at Ariana for normal incidence.] *Tunis. Service Botanique, Annuaire* 5(2):127-191, 1928. figs., tables. DWB—Data include hourly values at clear sky in gm/cm²/min of intensity of solar radiation at normal incidence; totals of solar radiation at normal incidence for four daily periods and for entire days; daily totals of solar radiation at normal incidence; monthly totals for four daily periods and for the entire day. Observations were made with Gorczyński-

hard pyrheliograph. (See also 3A-103, Jan. 1952, MAB.) Subject Headings: 1. Global radiation
2. Solar radiation intensity 3. Ariana, Tunisia.

5G-11 551.521.12(44)
Brazier, C.-E., Observations et travaux actinométriques effectués à l'Observatoire du Parc
Saint-Maur pendant l'année 1926. [Actinometric observations and work done at the Parc Saint-
Maur Observatory in 1926.] Paris. Université. Institut de Physique du Globe, Annales, 6:119-138,
1928. 8. DLC—Data include: amount of solar radiation received daily upon a horizontal surface of
1 cm (15th day of each month); daily values of intensity of solar radiation at given time of day;
maximum monthly values of solar radiation; hourly values of solar radiation for selected days;
values expressed in gm cal/cm²/min. Subject Headings: 1. Diurnal global radiation 2. Solar radia-
tion intensity 3. Paris, France.

5G-12 551.521.12(494)
Dorno, C., Tägliche, jährliche und säkulare Schwankungen der Sonnenstrahlung in Davos.
[Daily, yearly and secular variations of the solar radiation at Davos.] Paris, L'Expansion Scienti-
fique Française, 1928. 33 p. 6 figs., 7 tables. Also in: Monthly Weather Review, 57(2):54-55,
1929. Kimball, H. H. (trans.). DWB—Measurements of the intensity of solar radiation
during 20 years have been carried out at Davos by means of an Ångström compensation pyrheli-
ometer and secondary instruments; continuous photographic records have been maintained since
1911 by means of the Davos pyrheliograph. Data include: mean values (apparent time) of intensity
of solar radiation at normal incidence for each month of the year in gm cal/min/cm², annual means
of sun at altitude 30°, data on total solar radiation received on a horizontal surface from sun and
sky obtained by means of a photographically recording pyrheliometer, monthly and mean annual
total daily recorded total compared with corresponding means computed from the so-called normal
annual daily values, data on intensity of isolated spectral bands and UV radiation (diurnal and
annual variation) shortest perceptible wave lengths registered at different hours on cloudless days
for each month during year. Subject Headings: 1. Global radiation data 2. Solar radiation intensity
3. Spectral distribution of solar radiation 4. Davos pyrheliograph 5. Davos, Switzerland. I. Kim-
ball, H. H. (trans.).

5G-13 551.521.12(234.3)
Lipp, Hermann, Beiträge zum Strahlungsklima der Zugspitze. [Contribution to the radiation
climate of Zugspitze.] Bavaria. Landeswetterwarte. Deutsches Meteorologisches Jahrbuch [für
1927], 50:D1-49, 1928. 28 figs., 51 tables, 2 refs. DWB. Summary by Voigts, Heinrich and
Lipp, Hermann in: Zeitschrift für angewandte Meteorologie, 46:344-351, 1929. tables. DWB—
The solar radiation reported in this study covers a period of one year, Aug. 1926-July 1927. The
pyrheliometric instruments used were an Ångström compensation pyrheliometer and Michelson acti-
meter. The data include: mean daily sums for each month and sums of monthly total radiation
incident upon a surface perpendicular and horizontal to the sun's rays, for cloudless days; mean
daily heat sums upon a horizontal surface for each month (cloudiness taken into consideration) for
Garmisch, Arosa, Davos, Zugspitze, Riezler, St. Blasien, Feldberg (Black Forest), Vienna, Karlsruhe,
Pulkovo Observatory, Kiev, Warsaw, Helsinki and Spitsbergen; hourly march of heat radiation
on a horizontal surface on the 15th day of each month; mean hourly values of sums of diffuse
radiation, mean daily sum and mean monthly sum of diffuse radiation, mean daily sum of direct
radiation and mean daily sum of total radiation upon a horizontal surface on cloudless days. All
the values are in gm cal/cm². (Same item as 2K-100, Nov. 1951, MAB.) Subject Headings:
1. Global radiation data 2. Diffuse radiation 3. Diurnal global radiation variations 4. Zugspitze,
Germany. I. Voigts, H.

5G-14 551.521.12(431)
Schubert, Johann, Solar radiation in middle north Germany according to measurements at
Potsdam. Monthly Weather Review, 56(5):179-180, May 1928. Translation of article entitled
Die Sonnenstrahlung im mittleren Norddeutschland nach den Messungen in Potsdam in: Meteorolo-
gische Zeitschrift, 45:1-16, 1928. 18 diagrs., 6 tables, foot-refs. DWB—This paper presents in
tabular form the values of radiation in gm cal/min/cm² "with clear sky and with mean cloudiness
received at Potsdam, at each hour of the day at the middle of each month of the year on ten differently
posed surfaces as follows: plane, normal to the direction of the rays, horizontal plane, walls facing
north, east, south and west and slopes of 30° facing the above directions." Tables give radiation
values at 11 A.M. when intensity of full radiation is slightly below maximum; maximum values of
solar radiation with clear skies under different exposures, solar radiation with average cloudiness and
mean daily amounts of solar radiation received during the period April-Aug. (the mean growing
season). Subject Headings: 1. Diurnal global radiation variations 2. Solar radiation intensity
variations 3. Potsdam, Germany.

1929

5G-15

551.521.12

*Kimball, Herbert H., Records of the total solar radiation (direct and diffuse) received on a horizontal surface in Southern California. *Monthly Weather Review*, 57(7):300-301, July 1929. 2 tables. DWB—Tables contain daily totals of solar radiation for eight months 1928-1929 received on a horizontal surface at Scripps Institution of Oceanography, La Jolla, Calif. (Weather Bureau type of thermoelectric pyrheliometer recording on an Engelhard microammeter) monthly means for Pasadena, Calif., 1926-28 and computed monthly mean daily totals of solar radiation by pan method. *Subject Headings:* 1. Diurnal global radiation 2. Global radiation data 3. La Jolla, Calif. 4. Pasadena, Calif.

5G-16

551.521.13

*Schembor, Friedrich, Ergebnisse der Strahlungsmessungen auf der Stolzalpe in der Zeit vom 1. Oktober 1927 bis 1. November 1928. [Results of radiation measurements on the Stolzalpe during the period Oct. 1, 1927-Nov. 1, 1928.] *Akademie der Wissenschaften, Vienna, Math.-Naturwiss. Klasse, Abt. 2a, Sitzungsberichte*, 138:497-524, 1929. 16 tables. DWB—Data include the following: mean monthly total intensity as a function of time of day; mean monthly total radiation incident upon a horizontal surface as a function of time of day; monthly totals of hourly values of radiation intensity; monthly means of hourly values of radiation intensity incident upon a horizontal surface; monthly totals of hourly radiation intensity for a horizontal surface during average cloudiness; and monthly totals of solar radiation measured with a cadmium cell. All values are given in gm cal cm^{-2} . Radiation values are given for measurements made with red and yellow filters and with a filter. The instruments used were as follows: Ångström's pyrgeometer, Michelson-Magnan actinometer, pyranometer with UV filter, cadmium photocell, potassium photocell and Coblentz polarimeter and polariscope. *Subject Headings:* 1. Global radiation data 2. Solar radiation intensity 3. Short wave radiation intensity 4. Stolzalpe, Austrian Alps.

5G-17

551.521.14

van Gulik, D., Stralingsmetingen te Wageningen. [Radiation measurements at Wageningen, Netherlands. *Landbouwhoogeschool, Mededeelingen*, 33(5), 1929. 15 p. fig., table.] DA—Daily sums of global radiation upon a horizontal surface at Wageningen are given for each day of individual years 1926, 1927, 1928 and 1929. Data are in gm cal/cm^2 . Measurements made with Kipp solarimeter, an adaptation of the Moll thermopile. *Subject Headings:* 1. Diurnal global radiation 2. Kipp solarimeter 3. Wageningen, Netherlands.

1930

5G-18

551.521.15

*Holzapfel, Rupert, Hauptergebnisse der Strahlungsmessungen auf der Stolzalpe in der Zeit vom 1. Nov. 1928 bis 1. Oktober 1929. [Main results of radiation measurements on the Stolzalpe during the period Nov. 1, 1928-Oct. 1, 1929.] *Akademie der Wissenschaften, Vienna, Math.-Naturwiss. Klasse, Abt. 2a, Sitzungsberichte*, 139:373-392, 1930. 2 figs., 17 tables, ref. DWB—The data are as follows: monthly means of hourly values of total intensity of solar radiation without a filter, with red and yellow filters and for $\lambda = 650\text{m}\mu - \lambda = 530\text{m}\mu$, $\lambda < 530\text{m}\mu$; monthly means of total intensity of solar radiation as a function of zenith elevation of the sun, for the same filters and wavelengths; monthly values of hourly means of solar intensity incident upon a horizontal surface; monthly values of hourly heat totals incident upon a horizontal surface on clear days, etc. Values are expressed in $\text{gm cal cm}^{-2}/\text{min}$ or hr. *Subject Headings:* 1. Global radiation data 2. Radiation intensity 3. Spectral distribution of solar radiation 4. Stolzalpe, Austrian Alps.

5G-19

551.521.16

†*Kimball, Herbert H., Measurements of solar radiation intensity and determination of depletion by the atmosphere. *Monthly Weather Review*, 58(2):43-52, Feb. 1930. fig., 10 tables, bibliog. DWB—The paper supplements *Monthly Weather Rev.*, 55(4):155-169, April 1928, and contains a list of stations which obtain records of total radiation received from the sun and sky on a horizontal surface, monthly averages of daily totals of solar radiation received on a horizontal surface (gm cal/min/cm^2) at various localities over the world, weekly means of daily total solar radiation (direct and diffuse) received on a horizontal surface at various stations; annual total of solar radiation received on a horizontal surface; list of pyrheliometer stations, monthly means of solar radiation, atmospheric transmission, depletion of solar radiation by atmospheric dust for each month of the year in U. S. stations and Davos, Switzerland, etc. *Subject Headings:* 1. Global radiation data 2. Pyrheliometric stations 3. Solar radiation intensity 4. Solar radiation attenuation 5. United States.

5G-20 551.521.12(471) 551.521.3(471)
 *Lunelund, Harald, *Registrierung der Sonnen- und Himmelsstrahlung in Helsingfors*. [Registration of solar and sky radiation in Helsinki.] *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae*, 5(6), 1929-1930. 72 p. 13 figs., 65 tables, 13 ref. DLC—Contains data on intensity of solar radiation and solar radiation heat totals; intensity and heat totals of total radiation (sun and sky) intensity of diffuse radiation and daily and monthly totals. Daily and hourly values, as well as monthly and annual values for 1928 and also monthly and annual hourly values for 1927. *Subject Headings*: 1. Global radiation data 2. Diffuse radiation 3. Helsinki, Finland.

5G-21 551.521.1(434.6)
 *Peppler, Albert, *Die Gesamtstrahlung von Sonne und Himmel in Karlsruhe*. [Total radiation from sun and sky at Karlsruhe.] *Beiträge zur Physik der freien Atmosphäre*, 16:180-198, 1930. 19 p., 16 tables, ref. DWB—The measurements of direct and total (direct and sky) radiation was begun in 1926 with an Ångström pyranometer. The radiation measurements for the period 1927-1929 are presented and analyzed. These include: monthly sums of total radiation upon a horizontal surface, mean monthly daily sums of total radiation upon a horizontal surface, daily sums of total radiation upon a horizontal surface, monthly absolute maximum and minimum of total radiation (daily sums), and mean annual hourly march of total radiation. All values are in gm cal/cm². *Subject Headings*: 1. Global radiation data 2. Ångström pyrheliometer 3. Karlsruhe, Germany.

5G-22 551.521.12(485)
 *Sjöström, Martin, *Pyrheliometric measurements of the solar radiation in Uppsala during the years 1909-1922 together with an introductory survey of the work of solar radiation carried out at the Physical Laboratory during the years 1909-1929 and determination of the transmission of light through the blue and green colour-filters used at the pyrheliometric measurements*. *Svenska Vetenskapsakademien, Stockholm, Nova Acta Regiae*, Ser. 4, 6(6), 1930. 209 p. 5 figs., 2 tables, refs. DLC—The tables of all pyrheliometric measurements made at Uppsala contain measurements of total direct solar radiation with Ångström pyrheliometer taken every day when there has not been too much cloudiness and no cirrus veils to cause disturbance; the tables give data on date of observation, solar time of measurement, calculated true altitude of sun intensity of radiation in gm cal/cm²/min measured by Ångström's pyrheliometric scale for total radiation for green and blue radiation and temperature, atmospheric pressure, absolute and relative humidity, wind velocity and duration of time of observation. *Subject Headings*: 1. Global radiation 2. Ångström pyrheliometer 3. Uppsala, Sweden.

1931

5G-23 551.521.12(988)
 *Kimball, H. H., *Solar radiation intensities within the Arctic circle*. *Monthly Weather Review*, 59(4):154-157, April 1931. fig., 4 tables, 3 refs. DWB—Contains: 1) total solar radiation (direct and diffuse) measured at Green Harbor, Spitsbergen, for the period Sept. 1927-Aug. 1928, by means of a Gorczyński pyrheliometer (the data are summarized by weeks giving for each week the average daily amount of radiation, expressed in gm cal cm⁻² of horizontal surface and the maximum per day, per hour and per minute); 2) daily pyrheliometric readings made by J. E. CHURCH, JR., during Aug. 1927 in the course of a trip to and on inland ice east from lat. 66°50'N, long. 51°W (50 miles); and 3) pyrheliometric readings made by C. E. KALLQUIST at Mt. Evans, Greenland, during Sept. 1927 and April 1928. A graph gives diurnal march of solar radiation at Green Harbor, Spitsbergen, for representative days for each season. *Subject Headings*: 1. Solar radiation intensity 2. Global radiation data 3. Mt. Evans, Greenland. I. Church, J. E., Jr. II. Kallquist, C. E.

5G-24 551.521.12(471) 551.521.1(471)
 *Lunelund, Harald, *Registrierung der Sonnen- und Himmelsstrahlung in Helsingfors während der Zeit 1. Dezember 1928-31. Dezember 1929*. [Registration of solar and sky radiation in Helsinki for the period December 1, 1928 to December 31, 1929.] *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae*, 5(18), 1931. 56 p. 9 figs., 59 tables, 8 refs. DLC—Data include decadal means of intensity and monthly means of solar radiation for every hour, mean monthly values or solar radiation for 1929 and 1926-1929, daily and monthly total of direct solar radiation for 1929, effective radiation, decadal mean of intensity and monthly means of total radiation for 1929, mean monthly and annual values of total radiation for 1929 and 1927-1929, daily and monthly sums of total radiation, decadal intensity means and monthly means of diffuse radiation, mean monthly and annual values of diffuse radiation and hourly values of each day of every month from Dec. 1928 to Dec. 1929 of intensity of solar radiation and of total radiation. *Subject Headings*: 1. Global radiation data 2. Solar radiation intensity 3. Diffuse radiation 4. Helsinki, Finland.

5G-25

551.506.1:551.521.12

U.S.S.R. Hidro-meteorologicheskii Komitet, *Biulleten' Postoiannoi Aktinometricheskoii Komissii*, No. 1(18), 1931. 49 p. DWB—Contains daily and monthly totals of the amount of direct and diffuse radiation received upon a horizontal surface, and total (direct and diffuse) horizontal radiation in pentads in gm cal received on a horizontal surface. The data are for the period Jan. 1931 to April 1931 and for the following localities: Slutsk, Petrovskoe-Razumovskoe (Moscow) and Tbilisi. *Subject Headings*: 1. Global radiation 2. Diffuse radiation 3. Direct solar radiation 4. Solar radiation intensity 5. Petrovskoe-Razumovskoe (Moscow), U.S.S.R. 6. Tiflis, U.S.S.R. I. Kalitin, N. N. (ed.).

1932

5G-26

551.521.12(1)

Davis, George E. and McCarthy, Joseph L., *Twenty-five months of solar radiation at Tucson, Arizona*. *Monthly Weather Review*, 60(12):237-242, Dec. 1932. 4 figs., 3 ref. DWB—Intensities of direct solar radiation at wave lengths 0.50μ and 0.32μ were measured at Tucson, Arizona, from Feb. 1930 to Jan. 1932. The records were traced automatically on photographic plates by a Petrie solar radiometer. From the measurements on 500 plates, the authors computed values of intensities of radiation in absolute units for 9 h, 12 h and 15 h local apparent time. The data on intensities of solar radiation are presented by graphs in which each plotted point is an average of 10 days' values. Graphs showing average values of solar radiation of wave lengths 0.50 and 0.32μ from above curves are given. *Subject Headings*: 1. Solar radiation intensity 2. Spectral distribution of solar radiation 3. Pettit solar radiometer 4. Tucson, Ariz.

5G-27

551.521.12(1)

*Eckel, Otmar, *Zum Strahlungsklima der Kanzelhöhe (Kärnten)*. [Radiation climate of the Kanzelhöhe (Carinthia).] *Akademie der Wissenschaften, Vienna, Math.-Naturw. Klasse, Abt. Sitzungsberichte*, 141:187-226, 1932. 4 figs., 20 tables, ref. DWB—The solar radiation measurements are for the period March 1930-March 1931. The data include: monthly means of intensity of solar radiation as a function of solar elevation and of time of day; comparisons of measurements with similar data for Vienna, Potsdam, Davos and Zugspitze; mean totals of intensity upon a sphere, a horizontal surface, and upon a vertical cylinder as a function of time of day for average sunshine duration; monthly totals of solar intensity for clear and overcast skies on a sphere, horizontal surface and cylinder; comparison of mean monthly radiation totals of solar energy during average cloudiness with values for Vienna, Arosa and Zugspitze for a sphere, horizontal surface and cylinder. All these values are expressed in gm cal/cm². In addition, data are given on diffuse sky radiation, UV sun and UV sky radiation. The instruments used were an original Michelson bimetallic actinometer, a photoelectrometer with cadmium cell, an Ångström compensation pyranometer, an Ångström pyrgeometer and a Cornu polarimeter. *Subject Headings*: 1. Solar radiation intensity 2. Ultraviolet radiation intensity 3. Global radiation data 4. Diffuse radiation 5. Kanzelhöhe, Austria.

5G-28

551.521.12

*Efimov, I. E., *Summy tepla solnechnoi radiatsii dlia goroda Smolenska za 1930 g.* [Summary of heat of solar radiation for Smolensk during 1930.] *Geofizika*, Smolensk, No. 1:35-42, 1932. tab. DWB—Data include: daily totals of solar radiation received by surfaces perpendicular and horizontal to the sun's rays for the year 1930. The data are expressed in gm cal/cm². *Subject Headings*: 1. Global radiation data 2. Smolensk, U.S.S.R.

5G-29

551.521.12

*Kalitin, N. N., *Solnechnaia diffuznaia i zemnaia radiatsiia po nabludeniiam na Elbruse*. [Diffuse and terrestrial radiation according to observations made on Mt. Elbrus.] *Zhurnal Geofiziki i Meteorologii*, Moscow, 9(3):195-210, 1932. 4 figs., 10 tables, ref. English summary. DLC—Data include: maximum values of intensity of solar radiation at "Krugozor," variation of intensity of solar radiation with varying solar elevation, total solar radiation upon 1 cm² of horizontal surface for selected days, hourly totals of diffuse radiation upon 1 cm² of horizontal surface for selected days, etc. The data were obtained during Aug. 8-12, 1926. *Subject Headings*: 1. Global radiation data 2. Diffuse radiation 3. Mt. Elbrus, U.S.S.R.

5G-30

551.521.12

*Kohli, Shonti Sroup, *Solar radiation measurements at Poona in 1931*. *India. Meteorological Dept., Memoirs*, v. 25, Pt. 10:327-342, 1932. 2 figs., 17 tables, 8 refs. DWB—For the period Feb. 1931-Jan. 1932 the author presents values of solar radiation at normal incidence made at Poona with an Ångström pyrheliometer; mean monthly values of normal, total and red radiation for the function of local time and air mass, maximum, minimum and mean values of radiation at local

an monthly depletion of total radiation at noon due to water vapor and "dust"; and values of total energy received from the sun and sky on a horizontal surface as measured with a Callendar pyranometer namely, values of $S+H$ per day on a horizontal surface received from sun and sky and monthly values of $S+H$ on average, cloudless and overcast days, mean monthly totals of $S+H$ received per hour as a function of local time, intensity of $S+H$ as a function of local time and solar zenith distance and atmospheric depletion due to clouds, water vapor and dust. Values expressed in gm cal/cm^2 . **Subject Headings:** 1. Global radiation data 2. Solar radiation intensity 3. Solar radiation attenuation 4. Poona, India.

5G-31

551.521(62)

*Lahmeyer, Friedrich and Dorno, Carl W. M., Assuan: Eine meteorologisch-physikalisch-physiologische Studie. [Aswan: a meteorological-physical-physiological study.] Brunswick, Vieweg und Sohn, 1932. 68 p. 80 figs., 46 tables, refs. **DWB**—Data on radiation consist of two means of incoming and outgoing radiation during Dec. to March for 1929/30 in milligram $\text{cal/cm}^2/\text{sec}$. (Same item as 2J-142, Oct. 1951, MAB.) **Subject Headings:** 1. Radiation data 2. Assuan, Egypt.

5G-32

551.521.1(471)

*Lunelund, Harald, Registrering der Sonnen- und Himmelsstrahlung im Jahre 1930. [Record of solar and sky radiation for the year 1930.] *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae*, 6(12), 1932. 57 p. 8 figs., 65 tables, 4 refs. **DLC**—This continuation of previous registration of the radiation climate of Helsinki (see 5G-20) contains hourly and daily data for 1930 on the intensity of direct solar radiation on a surface normal to the radiation, total radiation (sun and sky) upon a horizontal surface, diffuse sky radiation expressed in kg cal/cm^2 data on number of sunshine hours. Also included are decadal means and monthly means of intensity of direct solar radiation for every hour for 1930 and for 1926-1930 in mg cal/min/cm^2 , mean monthly and annual values of direct solar radiation in cal/min/cm^2 for 1930 and 1926-1930, maximum values of solar radiation during 1930 and mean maxima for 1922-1930, for surface normal to solar radiation and upon a horizontal surface; daily and monthly means of direct solar radiation, total totals of direct solar radiation on a surface normal to the solar radiation; decadal, monthly means of intensity of solar radiation for every hour in mg cal/min/cm^2 , monthly and annual means of total radiation for every hour upon a horizontal surface for 1930 and monthly and annual means of total radiation for 1928-1930, daily and monthly totals of total radiation for 1930 and similar data for diffuse solar radiation as for total radiation. **Subject Headings:** 1. Global radiation data 2. Diffuse radiation 3. Solar radiation intensity 4. Direct solar radiation 5. Helsinki, Finland.

5G-33

551.521.1(98)

Mosby, Håkon, Sunshine and radiation. (In: Maud Expedition, 1918-1925, *Scientific Results of the Norwegian North Polar Expedition with the "Maud," 1918-1925*. v. 1(7), 1932. 110 p.) **DLC, DWB**—The data include mean hourly values of the total radiation received on a horizontal surface in $\text{gm cal/cm}^2/\text{min}$ and total radiation received each day for May-Oct. 1923, March 1924-March 1925. Radiation was measured with an Ångström pyrheliometer. The data are representative for lat. 73°N . **Subject Headings:** 1. Global radiation 2. Ångström pyrheliometer 3. Arctic region.

5G-34

551.521(26)(81)

*Riemerschmid Gertud, Strahlungsmessungen auf dem Atlantik und in Brasilien. [Radiation measurements in the Atlantic and in Brazil.] *Meteorologische Zeitschrift*, 49:218-226, 1932. 7 tables, 8 refs. **DWB**—Radiation measurements were made in the course of a voyage from Hamburg to Brazil. Measurements were grouped into 5 climatic zones: northern subtropics, northern trades, doldrums, southern subtropics and southern trades. The data comprise: total intensity of solar radiation ($\text{gm cal cm}^{-2} \text{ min}^{-1}$) and true red intensities of solar radiation ($\text{gm cal cm}^{-2} \text{ min}^{-1}$) as dependent upon solar altitude; maxima of total radiation and daily totals for selected days in $\text{gm cal cm}^{-2} \text{ min}^{-1}$. Measurements of transmissivity, red content of solar radiation, etc. were made. **Subject Headings:** 1. Global radiation data 2. Solar radiation intensity 3. Red solar radiation intensity 4. Atlantic Ocean 5. Brazil.

5G-35

551.521.1(45)

Zanon, Francesco Saverio, Radiazione solare globale a Venezia. [Total solar radiation in Venice.] *Meteorologia Pratica*, Turin, 13(5):221-228, 1932. fig., table, ref. **DWB**—Total (sun and sky) radiation was measured with a Gorczyński solarigraph during the period 1929-1931. Data on monthly mean of hourly values of total radiation and monthly sums are given in gm cal/cm^2 for each year of 1929, 1930 and 1931. **Subject Headings:** 1. Global radiation 2. Venice, Italy.

1933

5G-36

551.521.1

*Ångström, Anders, On the total radiation from sun and sky at Sveanor. *Geografiska Annaler*, 15(2/3):151-160, 1933. 3 tables, 16 refs., eq. DWB—The records of total radiation from sun and sky obtained by the Swedish-Norwegian Arctic Expedition of 1931 at Sveanor (79°56'N; 18°18'E) during July and part of Aug. by means of a Robitzsch actinograph are presented. Hourly totals for each day are given in gm cal/cm². *Subject Headings:* 1. Global radiation data 2. Sveanor, Sweden

5G-37

551.521.12(4)

*Eckel, O., Ein Jahr Intensitätsmessungen der Sonnenstrahlung in Traunkirchen (Österreich). [One year of solar radiation intensity measurements at Traunkirchen.] *Meteorologische Zeitschrift*, 50:261-264, 1933. 3 tables, ref. DWB—Observations on radiation were recorded at this station because of intense haze over Vienna. Data include relative numbers of total intensity of solar radiation at Potsdam 1907-1923 and 1931-32; monthly means of total radiation intensity arranged according to solar elevation and turbidity factor for Traunkirchen and Vienna. *Subject Headings:* 1. Global radiation data 2. Solar radiation intensity 3. Turbidity factor 4. Traunkirchen, Austria.

5G-38

551.521.12(4)

*Kimball, Herbert H., Solar radiation measurements obtained at the Blue Hill Meteorological Observatory of Harvard University during the Second International Polar Year, August 1932-August 1933. *Monthly Weather Review*, 61(8):230-232, Aug. 1933. 2 tables, ref. DWB—Tables give total (direct and diffuse) and screened solar radiation intensity (normal incidence) expressed in gm cal/cm²/min for specified morning and afternoon readings on particular days during each month of 1933, and weekly averages of daily totals of solar radiation received on a horizontal surface. *Subject Headings:* 1. Global radiation data 2. International Polar Year, 1932-1933 3. Blue Hill, Mass.

5G-39

551.521.12(4)

*Kussmann, H., Die Intensität der Sonnenstrahlung in Braunlage i. Harz. [Solar radiation intensity in Braunlage, Harz Mountains.] *Meteorologische Zeitschrift*, 50(11):403-411, Nov. 1933. 5 tables, 7 refs., 5 eqs. DWB—Data include: monthly means of total intensity of solar radiation in gm cal/cm²/min as a function of solar elevation, the red-infrared portion of the solar intensity ($\lambda > 635\text{m}\mu$), the yellow green portion of solar intensity ($\lambda = 525-635\text{m}\mu$) and the blue violet portion ($\lambda < 525\text{m}\mu$) of the solar intensity as a function of solar elevation expressed in gm cal/cm²/min. All measurements were made over the period of one year (May 1932-May 1933). *Subject Headings:* 1. Solar radiation intensity 2. Spectral distribution of solar radiation 3. Global radiation data 4. Harz Mountains, Germany.

5G-40

551.521.12(4)

*Laurens, Henry and Mayerson, H. S., Intensity and spectral distribution of solar radiation at New Orleans. *Optical Society of America, Journal*, 23:133-142, 1933. figs., 12 tables, 13 refs. DLC—Data include: monthly means of solar radiation intensities at normal incidence at 1000, 1200, and 1400h and absolute maxima gm cal/cm²; average monthly amount of total radiation for (sun and sky) on a horizontal surface for each hour and average monthly amount of total radiation for 1931 (sun and sky) on a horizontal surface on clear days only for each hour expressed in gm cal/cm²/min; monthly averages of energy distribution at noon on clear days for direct solar radiation at normal incidence (composite average of 56 months), (gm cal/cm²/min both total and for spectral wave length ranges); energy distribution on representative clear days; distribution of solar radiation as measured on a horizontal surface, etc. *Subject Headings:* 1. Global radiation data 2. Solar radiation intensity 3. Spectral distribution of solar radiation 4. New Orleans, La.

5G-41

551.521.12(4)

*Lunelund, Harald, Record of solar radiation in Helsingfors. *Finska Vetenskaps-Societets Helsingfors, Commentationes Physico-Mathematicae*, 7(1):1-28, 1933. 10 figs., 29 tables, ref. DLC—The data are presented both tabularly and graphically and either as four year means or individual years. They include: direct solar radiation, variation of direct solar radiation intensity, hour by hour, month during which radiation exceeded a given value, mean maximum and absolute minimum on a horizontal surface, radiation received in hour intervals per month; total and diffuse radiation—variation in the total radiation 1928-1930 in intervals of one hour per month, radiation received per month, annual variation of daily radiation; totals of radiation by months and years—monthly totals of solar radiation, recorded radiation per month in Helsingfors and maximum possible radiation on clear days were clear, total radiation and diffuse sky radiation, etc. All data are expressed in gm cal/cm².

Subject Headings: 1. Global radiation data 2. Diffuse radiation 3. Solar radiation intensity
Daily global radiation variations 5. Helsinki, Finland.

5G-42

551.521.1(471)

*Lunelund, Harald, *Registrierung der Sonnen- und Himmelsstrahlung in Helsingfors im Jahre 1931*. [Registration of solar and sky radiation in Helsinki during 1931.] *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae*, 7(5):1-35, 1933. 6 figs., 49 tables. **DLC**—Direct solar radiation was measured with a Geczyński pyrheliograph and total and diffuse radiation with two Ångström pyranometers. The data expressed in cgs units include: decadal intensity means and monthly means of direct solar radiation for every hour for 1931 and 1926-1931, annual intensities for every hour 1931 and 1926-1931, number of hours per month in which the intensity of radiation exceeds a given value 1927-1931; decadal intensity means and monthly means of direct solar radiation and of total radiation upon a horizontal surface for 1931 and 1928-1931; decadal intensities and monthly means of diffuse radiation upon a horizontal surface for 1931 and 1929-1931; daily and monthly totals of direct solar radiation for 1931, decadal heat totals for 1927-1931, monthly and annual totals of solar radiation 1927-1931, daily and monthly sums of total radiation for 1931, decadal heat totals of total radiation for each year 1928-1931; heat totals of diffuse radiation for 1931 and 1929, 1930, 1931 and diurnal values of hourly intensities of solar radiation for every month of 1931. **Subject Headings:** 1. Global radiation data 2. Diffuse radiation 3. Solar radiation intensity 4. Direct solar radiation 5. Helsinki, Finland.

5G-43

551.521(471)

*Lunelund, Harald, *Die Wärmesummen für Helsingfors*. [Heat totals for Helsinki.] *Meteorologische Zeitschrift*, 50(2):51-56, Feb. 1933. 2 figs., 12 tables. **DLC**—Radiation observations made in Helsinki are summarized; these include continuous 4-year record of solar radiation, continuous year record of global radiation and over a year's record of diffuse radiation. The data include: monthly means of hourly values of heat totals upon a surface normal to the radiation and of radiation upon a horizontal surface; monthly means of possible and actual daily heat totals; highest recorded daily heat totals; monthly means of hourly values of total radiation upon a horizontal surface and of diffuse radiation; monthly means of maximum and minimum daily sums of total and diffuse radiation; actual and possible monthly heat totals (kg cal cm^{-2}); annual and possible annual heat totals (kg cal cm^{-2}); and monthly sums of total and diffuse radiation for each year 1928-1930 (gm cal cm^{-2}). **Subject Headings:** 1. Global radiation data 2. Diffuse radiation 3. Possible global radiation 4. Helsinki, Finland.

1934

5G-44

551.521.1(485)

*Ångström, A. and Tryselius, Olof, *Total radiation from sun and sky at Abisko*. *Geografiska Annaler*, 16:53-69, 1934. 6 figs., 6 tables, 7 refs., eqs. **DWB**—Data include daily totals of sun and sky radiation expressed in kg cal/cm^2 for the period Aug. 1931 to Oct. 1932. **Subject Headings:** 1. Global radiation data 2. Abisko, Sweden.

5G-45

551.521(494)

*Dorno, Carl W. M., *Das Klima von Agra (Tessin)*. Eine dritte und letzte meteorologisch-physikalisch-physiologische Studie. [Climate of Agra (Tessin). The 3rd and last meteorological-physical-physiological study]. Brunswick, Fr. Vieweg und Sohn, 1934. 56 p. 8 figs., 41 tables. **DWB**—The radiation data given are as follows: seasonal averages of intensity of solar radiation as a function of time of day for 1922-1923; monthly values of radiation intensities (noon and maximum mean) in $\text{gm cal/cm}^2/\text{min}$ and heat totals of the sun (on a normal and horizontal surface for clear days and average on a horizontal surface) in $\text{gm cal/cm}^2/\text{day}$. **Subject Headings:** 1. Solar radiation intensity 2. Global radiation data 3. Tessin, Switzerland.

5G-46

551.521.12(44) 551.508.21

*Gorczyński, Władysław, *Climat solaire de Nice et de la Côte d'Azur*. [Solar climate of Nice and the French Riviera.] *Association des Naturalistes de Nice et des Alpes-Maritimes, Mémoire*, IV (i.e., VI?), 1934. 208 p. illus. tables, refs. **DLC**—The period of records for the observations is from 1928-1933. The data include intensity of solar radiation at normal incidence (hourly values of intensity of solar radiation, daily, monthly and annual totals of radiation, etc.); daily totals (mean of each month) and hourly means of intensity of global radiation, daily totals (mean of each month) of diffuse radiation. Radiation values are expressed in gm cal/cm^2 . This monograph is a detailed description of the solar climate of Nice and of the French Riviera containing in addition to the above, descriptions of the pyrheliometers and solarimeters, the astronomical elements of the solar climate, duration of insolation, atmospheric transmission of radiation, etc. **Subject Headings:** 1. Global radiation data 2. Solar radiation intensity 3. Diffuse radiation 4. Atmospheric transmission 5. French Riviera.

5G-47

*Gorczyński, Władysław, **Enregistrements du rayonnement solaire au moyen des solarigraphes et des pyréliographes.** [Recording of solar radiation by means of solarigraphs and pyréliographs. *Nice. Office Météorologique, Annales*, v. 2, 1934. 52 p. 7 figs., 19 tables, 18 refs. **MH-BH**—In addition to various actinometric data this publication contains the following data for Nice for the years 1931, 1932 and 1933: daily totals of global radiation, mean monthly values of daily totals, absolute daily minima and maxima, mean monthly maxima (5 daily) and mean monthly decadal means of daily totals of diffuse radiation and decadal and monthly means of diffuse radiation and monthly and annual totals of direct (pyréliometer) and global radiation (solarigraph) for cloudless and for all days for each month. *Subject Headings:* 1. Global radiation data 2. Diffuse radiation 3. Nice, France.

551.521.1(6)

5G-48

†Haurwitz, Bernhard, **Daytime radiation at Blue Hill Observatory in 1933, with application to turbidity in American air masses.** Cambridge, Mass., Harvard Univ. Press, 1934. 31 p. 7 figs., 16 tables, bibliog. **MH-BH**—The total radiation received from sun and sky on a horizontal surface by means of an Eppley pyréliometer was measured. The data include daily sums of total radiation on a horizontal surface for each month, total monthly income on a horizontal surface, monthly means of the daily sums of total radiation and monthly means of the daily course of the radiation on a horizontal surface; all the data are given in gm cal/cm². *Subject Headings:* 1. Global radiation data 2. Eppley pyréliometer 3. Blue Hill, Mass.

551.521.1(7)

5G-49

*Lunelund, Harald, **Contribution to the knowledge of solar radiation in Finland.** *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae*, 7(11), 1934. 58 p. 8 figs., 57 tables, 19 refs. **DLC**—Data are given on intensity of total direct sun radiation at Helsinki and other localities. Turbidity factors of total sun radiation, intensity of different spectral regions at Helsinki, turbidity factors for short radiation, intensity of total and diffuse radiation and totals of radiation including hourly, daily, monthly and yearly totals. *Subject Headings:* 1. Solar radiation intensity 2. Global radiation data 3. Diffuse radiation intensity 4. Short wave radiation 5. Helsinki, Finland.

551.521.12(4)

5G-50

*Mayerson, H. S. and Laurens, Henry, **Total solar radiation at New Orleans, La.** *Monthly Weather Review*, 62(8):281-286, Aug. 1934. 7 figs., 5 tables, 6 refs. **DWB**—Continuous records of the total solar radiation (direct and diffuse) were obtained by means of Kimball and Hobbs pyréliometer (modified by Eppley Laboratory) and a Richard recording millivoltmeter. Tables give the average hourly amount of total radiation received on a horizontal surface in gm cal/cm² for each month of 1932 and 1933 for clear days only for each year, and average daily total radiation (diffuse and direct) received on a horizontal plane in gm cal/cm²/min for specified periods during 1932 and 1933 obtained at New Orleans, La., Gainesville, Fla., Miami, Fla., La Jolla, Calif., Fresno, Calif., and Washington, D. C. The data are also presented graphically. *Subject Headings:* 1. Global radiation data 2. Kimball and Hobbs pyréliometer 3. New Orleans, La. 4. Gainesville, Fla. 5. Miami, Fla. 6. La Jolla, Calif. 7. Fresno, Calif. 8. Washington, D. C.

551.521.12(5)

1935

5G-51

*Gorczyński, Władysław, **Über den Zusammenhang zwischen den Summen der diffusen und der gesamten (Sonne-Himmel) Strahlung und der Sonnenscheindauer.** [On the relation between totals of diffuse and total (sun-sky) radiation and sunshine duration.] *Meteorologische Zeitschrift*, 52:201-206, 1935. 5 figs., 5 tables, 5 refs. **DWB**—The solarimeter and solarigraph used to measure total radiation are described. Tables based upon radiation data for Nice show: 1) variations of daily (gm cal/cm²/min) and also daily, monthly and annual (gm cal/cm²) totals of diffuse sky radiation for clear days; 2) intensity of diffuse sky radiation (mean values for period from 10:00 to 14:00) calculated for different daily amounts of sunshine duration, expressed as fractions of astronomical possible sunshine durations; 3) mean sums of diffuse sky radiation as dependent upon sunshine duration in hours (cal gm days cm⁻² horizontal surface); 4) daily means of diffuse and of total radiation for all days and for clear days (monthly means) and 5) a comparison of total radiation (cal cm⁻² of horizontal surface) at Nice and at Conegliano, Paris, Warsaw, Helsinki and Slutsk, Dec., June and annual total. *Subject Headings:* 1. Global radiation 2. Diffuse radiation 3. Nice, France 4. Paris, France 5. Conegliano, Italy 6. Warsaw, Poland 7. Helsinki, Finland 8. Slutsk, U.S.S.R.

551.521.1:551.521.11

5G-52 551.521.12
 *Perl, Gertrud, **Zur Kenntnis der wahren Sonnenstrahlung in verschiedenen geographischen Breiten.** [The true solar radiation at different geographical latitudes.] *Meteorologische Zeitschrift*, (3):85-89, March 1935. 2 figs., 3 tables, 7 refs. DWB—On the basis of radiation data for the period 1907-1933 from 80 stations, the author gives the mean daily variations of radiation intensity in $\text{cal cm}^{-2} \text{ min}^{-1}$ according to solar elevation upon a surface perpendicular to the sun's rays for different latitudes and the mean daily march of radiation on a horizontal surface for March, June, Sept. and Dec.; daily totals of radiation (cal cm^{-2}) on a horizontal surface for different latitudes for March, June, Sept. and Dec. and daily sums of radiation upon a horizontal surface for the 15th day of each month, Jan.-June inclusive. *Subject Headings:* 1. Calculated global radiation 2. Global radiation data 3. Latitudinal global radiation.

5G-53 551.521(262)(267) 551.521.3(262)(267)
 *Steinhaus, Ferdinand, **Über die Ergebnisse der bisherigen Strahlungsmessungen im Mittelmeer, im Indischen Ozean und im Südchinesischen Meer.** [Results of radiation measurements in the Mediterranean and Red seas, in the Indian Ocean and South China Sea.] *Meteorologische Zeitschrift*, 52:284-288, Aug. 1935. 8 tables, 9 refs. DWB—The following radiation data are summarized in tables: intensities of solar radiation ($\text{gm cal cm}^{-2} \text{ min}^{-1}$) and turbidity factors observed over the Mediterranean Sea-Indian Ocean-South China Sea in 1929 by S. SAMOILENKO; mean daily variation of turbidity factor; daily totals of radiation for selected days upon a surface normal to radiation and upon a horizontal surface in gm cal cm^{-2} ; and noon radiation intensities determined by W. GORCZYŃSKI and L. SAWICKI (1923) in the same region. *Subject Headings:* 1. Solar radiation intensity 2. Turbidity factor 3. Global radiation data 4. Mediterranean Sea 5. Red Sea 6. Indian Ocean 7. South China Sea.

1936

5G-54 551.521.1(44)(47)
 *Gorczyński, Władysław, **Measurements of solar radiation. Instruments and some results.** *Meteorological Magazine*, London, 71(842):29-33, March 1936. 3 tables. DWB—Contains tables giving mean monthly values of daily totals of diffuse (sky) and total (sun and sky) solar radiation in cal/day/cm^2 of horizontal surface) during the period 1931-33, at Nice, France; hourly values of solar radiation intensity during clear days and the "all day" totals for whole months and year at Nice (means for 1931-33), monthly maxima of solar radiation intensity (measured by pyrheliometers) at Nice (1931-33) and Leningrad (1914-1926) and solar radiation totals received directly from the sun and diffusely from sky (in kg cal/cm^2 of horizontal surface for Dec., Jan. and year) at Nice, Paris, Warsaw, Rothamsted, London and Helsinki. *Subject Headings:* 1. Global radiation data 2. Solar radiation intensity 3. Diffuse radiation 4. Nice, France 5. Leningrad, U.S.S.R. 6. Paris, France 7. Warsaw, Poland 8. Rothamsted, England 9. London, England 10. Helsinki, Finland.

5G-55 551.521(712) 551.521.11(712)
 *Olsson, Hilding, **Radiation measurements on Isachsen's Plateau.** *Geografiska Annaler*, No. 4:225-244, 1936. 4 figs., 5 tables, 16 refs. DLC—The observations on duration of sunshine, total radiation from sun and sky extended over the period June 26 to Aug. 15, 1934. The values for the former are based upon eye observations; the latter were measured with an actinograph of the Kobitzsch type controlled with an Ångström type pyranometer. Tables give for each day: 1) the duration of sunshine in fractions of an hour for each hour of the day, the daily total of sunshine and the highest possible total of sunshine; 2) the hourly values of the incoming radiation on a horizontal surface, the total radiation for the day determined from the hourly deflection and from the area under the curves expressed in gm cal cm^{-2} . Also included are a discussion of the total incoming radiation during clear, foggy and cloudy days (shown graphically), momentary measurements of the reflection from snow surfaces and absorption of radiation in snow. *Subject Headings:* 1. Global radiation data 2. Isachsen's Plateau, Spitsbergen.

5G-56 551.521.12(57)
 Pozdeev, V. G., **Aktinometricheskie nabludeniiia v Sverdlovsk.** [Actinometric observations in Sverdlovsk.] (In: Sverdlovsk, U.S.S.R. Magnitnaia i Meteorologicheskaiia Observatoriia, *Obshchii Sbornik*, 1836-1936. Sverdlovsk, Upravlenie Gidrometsluzhby, 1936. p. 181-226. Photostat.) DLC—The observations on solar radiation with Michelson's actinometer and the calculations of the heat totals with an actinograph were begun in 1915 in the Sverdlovsk Observatory. From 1916 observations by means of an Ångström pyrheliometer were begun. The data summarized are based upon observations made in 1916, 1918, 1919, 1934 and 1935. They include daily sums of solar radiation on a surface perpendicular to sun's ray, on horizontal surface, monthly totals of solar radiation for Slutsk and Sverdlovsk, and mean monthly daily march of solar radiation upon surfaces

oriented towards south, east, west and north for each hour and daily total. All the values are in gm cal/cm². *Subject Headings:* 1. Global radiation 2. Ångström pyrheliometer 3. Sverdlov U.S.S.R. 4. Slutsk, U.S.S.R.

5G-57

551.521.12(4)

*Stenz, Edward, *Promieniowanie stoneczne w Zabiem na Pokuciu*. [Solar radiation at Zabie (Carpathians of Pokucie).] *Poland. Państwowy Instytut Meteorologiczny, Wiadomości Meteorologiczne i Hydrograficzne*, 16(1-3):1-12, 1936. 4 figs., 8 tables, 13 refs. French summary p. 12. **DWB**—Paper gives data (for 1934-1935) on intensity of total solar radiation in gm cal cm⁻² on a normal surface as a function of atmospheric mass (for various days of the month), mean monthly intensities of solar radiation as a function of atmospheric mass and as a function of solar elevation, and monthly means of daily variations of solar intensity. A comparison of the solar intensity at War and Zabie and of the mean monthly intensities at these places. *Subject Headings:* 1. Global radiation data 2. Solar radiation intensity 3. Zabie, Poland.

1937

5G-58

551.506.1 551.521.12(431) 551.508

Germany. Reichsamt für Wetterdienst, *Deutsches Meteorologisches Jahrbuch*, 1936, Teil 1. *Beobachtungen des Observatoriums Potsdam*. Berlin, 1937. **DWB**—Solar intensity is measured with a bimetallic actinometer according to Michelson-Marten. For comparison, measurements were made with the Ångström pyrheliometer and the silver disc actinometer. The heat totals were recorded with a Moll-Gorczyński thermoelectric pyrheliograph. Hourly totals of solar radiation are given for each day of every month and are expressed in gm cal/cm². The observations were begun in 1930 and continued up until 1938. *Subject Headings:* 1. Global radiation 2. Potsdam, Germany 3. Wahnsdorf, Germany 4. Aachen, Germany.

5G-59

551.506.1 551.521.12(42) 551.521

Great Britain. Meteorological Office, *The Observatories' Yearbook. 1911-1937*. London, 1937. **DWB**—The yearbook contains a summary of the methods used and the results obtained in solar radiation studies carried out by the U. S. Weather Bureau from 1927 up until 1936. Tables give a list of pyrheliometer stations in the United States and the instruments used, weekly means of total solar and sky radiation on a horizontal surface, gm cal cm⁻² for all the stations, weekly mean hourly totals of solar and sky radiation on a horizontal surface at Washington, D. C. (1927-36), monthly mean intensities of direct solar radiation at normal incidence (a.m. and p.m. intensities, average of these two reduced to mean solar distance); for Washington, D. C., Madison, Wisc., Lincoln, Nebr., and Blue Hill, Mass.; maximum observed normal incidence intensities in gm cal/cm² min; and sky polarization values. *Subject Headings:* 1. Global radiation 2. Gorczyński solarigraph 3. Kew Observatory, England.

5G-60

551.521.12(73) 551.521.3

*Hand, Irving F., *Review of United States Weather Bureau solar radiation investigations, 1911-1937*. *Monthly Weather Review*, 65:415-441, Dec. 1937. 23 figs., 12 tables, ref. **DWB**—The author presents a summary of the methods used and the results obtained in solar radiation studies carried out by the U. S. Weather Bureau from 1927 up until 1936. Tables give a list of pyrheliometer stations in the United States and the instruments used, weekly means of total solar and sky radiation on a horizontal surface, gm cal cm⁻² for all the stations, weekly mean hourly totals of solar and sky radiation on a horizontal surface at Washington, D. C. (1927-36), monthly mean intensities of direct solar radiation at normal incidence (a.m. and p.m. intensities, average of these two reduced to mean solar distance); for Washington, D. C., Madison, Wisc., Lincoln, Nebr., and Blue Hill, Mass.; maximum observed normal incidence intensities in gm cal/cm² min; and sky polarization values. *Subject Headings:* 1. Solar radiation intensity 2. Global radiation data 3. Washington, D. C. 4. Madison, Wisc. 5. Lincoln, Nebr. 6. Blue Hill, Mass.

5G-61

551.521.12

*U.S.S.R. Komitet po Provedeniiu 2-go Mezhdunarodnogo Poliarnogo Goda, *Aktinometricheskoe nabludeniia Vtorogo mezhdunarodnogo poliarnogo goda, 1932-1933*. [Actinometric observations of the 2nd International Polar Year, 1932-1933.] Leningrad, Glavnaia Geofizicheskaya Observatoriia, 1937. 48 p. entirely tables. **DLC**—The actinometric data collected during the Second International Polar Year 1932-1933 consists of solar radiation, total and diffuse radiation (Kipp pyranometer), total and diffuse radiation (Arago-Davy-Kalitin actinometer), terrestrial radiation, and total and diffuse illumination. The intensities at a given time are expressed as radiation in min/cm² of perpendicular and horizontal surfaces. The localities at which observations were made are: S. Poliarnoe, Calm Bay, Matochkin Shar, Mastyr, Tiksi Bay, Lawrence Bay and Cape Des

Subject Headings: 1. Global radiation data 2. Diffuse radiation 3. Solar radiation intensity
 Kalitin pyranometer 5. International Polar Year, 1932-1933 6. Soviet Arctic. I. Kaltin, N. N.
 Leningrad. Gladynaia Geofizicheskaja Observatoriia.

1938

5G-62 551.521.12(485) 551.501.1:551.508.21/5
 *Ångström, Anders, Actinometric measurements near Stockholm, 1930-1936. Sweden. Meteorologisk-Hydrografiska Anstalt, Meddelanden, Ser. Uppsatser, No. 23:1-28, 1938. figs., tables, refs. DWB—Actinometric measurements made with the Michelson actinometer No. 129 and No. 5 over the period 1930-1936 are given in tables. The following elements are tabulated: 1) day of the month; 2) true local time; 3) height of the sun above horizon in degrees; 4) apparent air mass with vertical mass as unit (not reduced for pressure); 5) radiation measured with Michelson actinometer, (a) total radiation, (b) radiation transmitted through yellow filter OG, (c) the same radiation multiplied by the factor 1.14 to reduce for reflection, (d) radiation transmitted through red filter, (e) the same radiation multiplied by 1.19 to reduce for reflection; 6) barometric pressure at the observation hour, nearest coinciding with the time of actinometric observation; 7) pressure of aqueous vapor at same hour and 8) state of cloudiness. All the radiation values are given in $\text{gm cal/cm}^2 \text{ min}^{-1}$. **Subject Headings:** 1. Global radiation data 2. Solar radiation intensity 3. Atmospheric transmission 4. Stockholm, Sweden.

5G-63 551.521.12(471)
 *Keränen, J. and Lunelund, Harald, Über die Sonnen- und Himmelsstrahlung in Sodankylä während des Polarjahres 1932-1933. [Sun and sky radiation at Sodankylä during the Polar Year 1932-1933.] Suomalainen Tiedekatemia, Helsinki. Petsamo Observatorium, Veröffentlichungen, Spezielle Untersuchungen von dem Internationalen Polarjahr, 1932/33, No. 2, 1938. 48 p. 17 figs., 1 table, 16 refs. MH-BH—The data on heat amounts include: daily and monthly sums of direct solar radiation at Sodankylä, radiation incident upon a horizontal surface for decadal periods of each month, monthly totals of solar radiation upon a horizontal surface at Sodankylä and Helsinki during 1932-1933. The data are given in kg cal/cm^2 . **Subject Headings:** 1. Global radiation data 2. Direct solar radiation 3. Sodankylä, Finland.

5G-64 551.521.1(547)
 *Raman, P. K., Measurement of the radiation from the sun and the sky at Poona in 1935. India. Meteorological Dept., Memoirs, 26:151-164, 1938. 12 figs., 10 tables, 6 refs. DWB—This study of the hourly and seasonal variations of solar radiation at Poona contains the following data for 1935: daily values of S+H (gm cal/cm^2) per day on a horizontal surface received from sun and sky and duration of bright sunshine in hours; mean values of S+H (sun and sky) on average, cloudless and overcast days and extreme values; mean monthly totals of S+H (sun and sky) ($\text{gm cal/cm}^2/\text{hr}$) received per hour; intensity of S+H (sun and sky) ($\text{gm cal/cm}^2/\text{hr}$) on typical clear days as a function of time and hourly intensity of solar radiation (S+H) on overcast days. **Subject Headings:** 1. Global radiation data 2. Solar radiation intensity 3. Poona, India.

1939

5G-65 551.521.12(98)
 *Berezkin, Vsevolod A. (ed.), Aktinometricheskie nabludeniia poliarnykh stantsii Glavnogo upravleniia severnogo morskogo puti, 1935-1937 gody. [Actinometric observations at the polar stations of the Principal Administration of the Northern Sea Route, 1935-1937.] Leningrad. Arkhivskii Nauchno-issledovatel'skii Institut, Trudy, 136(3), 1939. 221 p. tables. DLC—Hourly, daily and monthly values of amount of heat of total radiation income in $\text{gm cal/cm}^2/\text{hr}$ on a horizontal surface for 1937 for the following localities in the Soviet Arctic: Cape Zhelaniia, Lonely Island and Viki Bay; for Cape Cheliuskin only the daily and monthly totals of heat of solar and diffuse radiation income in gm cal/cm^2 horizontal surface for March-Sept. 1937 are given. **Subject Headings:** 1. Global radiation data 2. Soviet Arctic.

5G-66 551.521.12(469)
 *Coimbra. Universidade. Instituto Geofísico, Estudos Actinométricos. Radiação solar global observações do ano de 1938, 1939. v. 1-2, 1938-1939. Publ. Coimbra, Tipografia da Atlantida, 1939-1940. 2 vols. in one. mostly tables. DWB—The two volumes contain very detailed measurements of global solar radiation for the years 1938 and 1939 made with an Ångström pyrheliometer. The data include hourly values, maximum and minimum hourly values, daily total and monthly totals of global solar radiation for each day and for each month. The values are in gm cal/cm^2 . **Subject Headings:** 1. Global radiation data 2. Ångström pyrheliometer 3. Coimbra, Portugal. I. Brandão, Joaquim de Sousa.

5G-67

551.521.12

Hand, Irving F., **Variations in solar radiation intensities at the surface of the earth in United States.** *Monthly Weather Review*, 67(4):338-340, Sept. 1939. fig., table, 8 refs. **DW** This paper brings up to date earlier articles published by KIMBALL, 1918 and 1924 (see 5G-67). For stations in the U. S., departures from normal were obtained by averaging the mean departures for each month for three stations (Washington, D. C., Madison, Wisc., and Lincoln, Nebr.) and Blue Hill Observatory and smoothing out the departures. The monthly averages of solar radiation at the earth's surface expressed as percentages of the monthly normals for the period 1924-1937 inclusive are given in graphs and in a table. *Subject Headings:* 1. Solar radiation intensity 2. United States.

5G-68

551.521.1(4)

*Hoelper, Otto, **Registrierungen der Sonnen- und Himmelsstrahlung im Allgäu.** [Sun and sky radiation records in Allgäu.] *Meteorologische Zeitschrift*, 56:333-342, 1939. 2 figs., 8 tables, 2 refs. **DWB**—Data include: 1) mean daily heat totals of solar radiation upon a horizontal surface in gm cal/cm² for the period 1923-1937; table gives mean monthly values for each hour; 2) mean daily heat totals of solar radiation for each year from 1923-1937; 3) mean daily heat totals of radiation from sun and sky upon a horizontal surface for clear days and mean daily heat totals of radiation from sun and sky for clear days for the period 1923-1937. *Subject Headings:* 1. Global radiation data 2. Allgäu, Germany.

1940

5G-69

551.521.1(4)

Chorus, Ulrich, **Sonnen- und Himmelsstrahlung auf dem Jungfraujoch während des internationalen Polarjahres 1932/33.** [Sun and sky radiation on the Jungfraujoch during the International Polar Year, 1932/33.] *Helvetica Physica Acta*, Basel, 12(6):537-552, 1940. 11 figs., 2 tables, 7 refs. **DLC, DWB**—The total radiation from sun and sky incident upon a horizontal surface was recorded with a Górczyński solarimeter; auxiliary recordings were made with a bitzsch actinograph. The monthly sums of total radiation from sun and sky upon a horizontal surface in gm cal/cm² on the Jungfraujoch and at Helsinki and Davos are given in a table. (See item as 2K-216, Nov. 1951, *MAB*.) *Subject Headings:* 1. Global radiation 2. International Polar Year, 1932-1933 3. Jungfraujoch, Switzerland.

5G-70

551.521.12(453)

*Polli, Silvio, **Radiazione solare globale a Trieste.** [Total solar radiation at Trieste.] *Ricerca Scientifica*, Rome, 11(10):706-710, Oct. 1940. graphs, tables, 11 refs. **DLC**—Continuous total radiation has been recorded with a Górczyński solarigraph since 1930. The monthly sum of total radiation in gm cal/cm²/month and year for the individual years 1934-1939, and also the average monthly and average minute total radiation for the interval 1934-1939 are given. *Subject Headings:* 1. Global radiation data 2. Górczyński solarigraph 3. Trieste.

5G-71

551.521.1

*Riemerschmid, Gertrud, **South Africa solar radiation survey, 1937-38.** *Onderstepoort Journal of Veterinary Science and Animal Industry*, 15(1/2):343-418, 1940. 5 figs., 16 graphs, 15 tables, 1 ref. **DA**—Data presented include the monthly total amounts and yearly total amounts of sun and sky radiation at Johannesburg, Bloemfontein, Nelspoort, Durban, Port Elizabeth and Cape Town, expressed in gm cal/cm² of a horizontal surface for the year 1937-38. The total amount of radiation was measured with a pyranometer and solarimeter. *Subject Headings:* 1. Global radiation data 2. South Africa.

5G-72

551.521.1

*Zuidhof, G. and De Vries, D. A., **Stralingsmetingen te Wageningen 1930-1940.** [Radiation measurements at Wageningen, 1930-40.] *Wageningen, Netherlands. Landbouwhoogeschool, Mededelingen*, 44(4), 1940. 18 p. figs., tables, ref. **DA**—For each year of the period 1931-1940 inclusive, for Wageningen, data are given on daily amount of global radiation, decadal means of monthly totals of global radiation incident upon a horizontal surface. The data are in gm cal/cm² and measurements made with a Moll thermopile. *Subject Headings:* 1. Global radiation data 2. Wageningen, Netherlands.

1941

5G-73

551.521.1

*Hand, Irving F., **A summary of total solar and sky radiation measurements in the United States.** *Monthly Weather Review*, 69(4):95-125, April 1941. 19 figs., 21 tables. **DWB**—The summary data for varying periods of record (1923-1939) of the total solar and sky radiation made by the Weather Bureau and cooperating institutions is presented in tabular form and also graphically.

leths. A list of stations, together with instrumental equipment which in all cases, except Miami, consisted of Eppley thermometric pyrheliometers, is given. The data include the weekly mean daily totals of solar and sky radiation on a horizontal surface for every station, the weekly mean daily totals composite of 15 stations, and the percentage departure of mean of maximum and minimum from the annual mean. *Subject Headings:* 1. Global radiation data 2. Eppley pyrheliometer 3. United States.

1942

5G-74 551.521.1(494)
Brückmann, W. and Ambrosetti, F., *Beobachtungen 1939 des Observatoriums Locarno-Monti*. Observations of the Locarno-Monti Observatory, 1939.] *Switzerland. Meteorologische Zentralanstalt, Annalen*, 76(6), 1939. 6 p. Also: *Osservatorio Ticinese Locarno-Monti Beobachtungen* 1939. *Ibid.*, 79(6), 1942. 9 p. DWB—1) Contains daily sums of total radiation (sun and sky) for 1939 in gm cal/cm²/min. 2) Continuation of annual meteorological observations reported since 1935, the following radiation data are included: partial results of direct measurement of the intensity of total solar radiation (without sky) in gm cal/cm²/min measured at first with a Davos pyrheliometer, then by Gorczyński and subsequently with a Pyrograph Volochine No. 74, and total daily radiation from sun and sky measured with a Robitzsch actinograph. *Subject Headings:* 1. Global radiation data 2. Robitzsch actinograph 3. Locarno-Monti, Switzerland.

5G-75 551.521.1(492)
Reesinck, J. J. M. and De Vries, D. A., *De jaarlijkse en dagelijkse gang van het daglicht in Nederland*. [The annual and daily variation of solar radiation in the Netherlands.] *Wageningen, Netherlands. Landbouwhogeschool, Mededeelingen*, 46(1), 1942. 24 p. 9 figs., 3 tables, ref. English summary p. 24. DA—This study contains daily sums of global radiation incident upon a horizontal surface at Wageningen for each day of the years 1938, 1939, 1940 and 1941 in gm cal/cm². Decadal means and monthly totals are included. *Subject Headings:* 1. Global radiation data 2. Wageningen, Netherlands.

5G-76 551.521.12(431.2)
Rühle, H., *Ergebnisse der Strahlungsregistrierungen am Staatlichen Observatorium Danzig* 1931-1932. [Results of radiation recordings in the State Observatory in Danzig, for 1931, 1932.] *Danzig, [1932?, 1933?]* 20 p.; 21 p. tables. Also: Frischmuth, Georg, *Beiträge zum Strahlungsklima von Danzig* 1. [Contribution to the radiation climate of Danzig.] *Danzig. Meteorologisches Institut, Forschungsarbeiten*, No. 1-8; 11, 1928-1936; 1942. DWB—The results of actinometric measurements given in the tables constitute "intensity of solar radiation in which hourly values for all hours of local time are given for every day of the year" and hourly totals of direct solar radiation at normal incidence for 1931 and 1932. Values are expressed in gm cal. Subsequent reports on solar radiation are published by G. FRISCHMUTH for 1933, 1934, 1935. *Subject Headings:* 1. Global radiation data 2. Danzig, Poland. I. Frischmuth, Georg.

5G-77 551.521.1(494)
Thams, J. Chr., *Die Strahlung von Sonne und Himmel in Zürich*. [Radiation from sun and sky at Zurich.] *Switzerland. Meteorologische Zentralanstalt, Annalen*, v. 79, 1942. 10 p. 7 figs., 1 table, 24 refs. Abstracted from reprint. DWB—The global radiation at Zurich is given for the period 1938-1942 and compared with measurements at other localities. The data include: daily totals of total radiation on cloudless days, monthly total, average daily total for each month at Zurich, monthly totals of global radiation at the Jungfrauoch and Davos; decadal values of global radiation at Zurich for each year of 1938-1942; monthly totals of global radiation and mean daily radiation totals for each year 1938-1942, etc. Also the relationship between sunshine duration, cloudiness and total radiation is examined and empirical formulas are established for calculating total radiation. The influence of cloudiness upon total radiation is examined. All the data are given in gm cal/cm². (Same item as 10-85, Oct. 1950, MAB.) *Subject Headings:* 1. Global radiation data 2. Zurich, Switzerland.

1943

5G-78 551.521.12(431) 551.521.11(431)
Dorfwrith, Maria, *Normalewerte und Registrierungen der Sonnenstrahlung in Potsdam*. [Normals and records of solar radiation in Potsdam.] *Meteorologische Zeitschrift*, 60:121-131, 1943. figs., tables, 11 refs. DWB—The data include: monthly values of mean solar radiation intensity for different solar altitudes in gm cal/cm² and mean monthly heat totals for cm²/hr of a horizontal surface in gm cal for clear days for the period 1924-1940; mean daily course of sunshine duration as measured by the Campbell-Stokes recorder for the period 1911-1940, mean hourly totals of heat sums for cm² of horizontal surface with reference to sunshine duration for the period

1924-1940, etc. *Subject Headings:* 1. Solar radiation intensity 2. Global radiation data 3. Sunshine duration 4. Campbell-Stokes recorder 5. Potsdam, Germany.

5G-79

551.521(4)

*Lunelund, Harald, *In Finnland eingestrahle Lichtenergie*. [Light energy radiated in Finland] *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae*, 11(2):1-19, 1954, 5 figs., 12 tables, 6 refs. **DLC**—A calculation for all Finland of the effective heat totals impinging upon a horizontal surface. Data include: monthly means of turbidity factor on clear days, different solar (Helsinki) elevation, total and diffuse radiation on clear days (Finland), daily total of radiation on a horizontal surface for the 15th day of every month, monthly and annual total radiation, heat totals of total radiation during Oct.-April and May-Sept., and mean incoming radiation, effective heat amounts (total radiation) for various localities in Finland. Isopleths of total heat amounts per year during growth season, and of total heat amounts during April and May are given. *Subject Headings:* 1. Global radiation data 2. Turbidity factor 3. Helsinki, Finland

5G-80

551.521.1(4)

Marten, W., *Vorläufige Monatsmittelwerte der täglichen Wärmesummen der Globalstrahlung (cal/cm²) in Potsdam (1893-1940) aus Strahlungsregistrierungen und Bewölkungsbeobachtungen*. [Preliminary monthly means of daily totals of global radiation (cal/cm²) in Potsdam (1893-1940) from radiation records and cloudiness observations.] *Meteorologische Zeitschrift*, 60:63-64, 1951, 1 table. **DWB**—Gives a table showing monthly means of daily heat totals of global radiation in Potsdam for each year from 1893-1940; data are expressed as cal/cm² of a horizontal surface. Calculated data are based upon sunshine duration data for 48 years. *Subject Headings:* 1. Global radiation 2. Calculated global radiation 3. Potsdam, Germany.

5G-81

551.521(4)

*Mayerson, H. S., Graham, J. S. and Laurens, Henry, *Summary of the intensity and spectral distribution of solar radiation at New Orleans 1931-40, inclusive*. *Monthly Weather Review*, 70:43-48, March 1943. 2 figs., 9 tables, 5 refs. **DWB**—This 10 year summary contains the same data for the same stations as the previous summaries (see 5G-50) except that in Sept. 1939 the Rich recording millivoltmeter was replaced by a Leeds and Northrup recording potentiometer. It includes the average monthly intensities of solar radiation at normal incidence (values calculated from at least one monthly determination for each of the 10 years), hourly averages of total radiation for each month of the year, the maximum hourly averages and highest daily totals for each year, average percentage distribution of ultraviolet luminous and infrared energy in direct sunlight, in total radiation, average total and spectral distribution of diffuse sky radiation, monthly mean annual variation of UV <400 mμ, annual variation of UV <313 mμ, intensities of solar radiation and monthly means of annual variation of UV <313 mμ in the total radiation. *Subject Headings:* 1. Global radiation data 2. Solar radiation intensity 3. Ultraviolet radiation intensity 4. New Orleans, La.

5G-82

551.521.1(4)

*Prohaska, Federico, *Die Globalstrahlung in Davos*. [Global radiation in Davos.] *Beiträge zur Geophysik*, Leipzig, 59(3/4):247-275, 1943. 4 figs., 10 tables, 25 refs. French, German and English summaries p. 247-248. **DLC**—A discussion of the climatological results of six-year records of the total incoming radiation of sun and sky on a horizontal surface at Davos recorded by a Robitzsch actinograph, in particular the climatological mean and extreme values and the conditions of radiation days and on days without any sunshine. The data include: decadal means and monthly means of total radiation for the period 1935-1941, in gm cal/cm²/day and the mean maximum global radiation of each month over the period 1935-1941 in gm cal/cm²/day and frequency distribution of daily sums of total radiation for the individual months for the period 1935-1941 in gm cal/cm²/day. *Subject Headings:* 1. Global radiation data 2. Robitzsch actinograph 3. Davos, Switzerland.

1945

5G-83

551.521.1(4)

*Mosby, Håkon, *Total radiation income at Olden Nordfjord*. Bergen. Universitetet, Årshandleidinger og Årsberetning, Naturvidenskapelig Rekke, No. 3, 1945. 19 p. 6 figs., 12 tables, 7 refs. **DWB**—The total radiation income on a horizontal surface was registered by means of a Fuess-Robitzsch bi-metal actinograph No. 140825 at a station near the eastern shore of Olden in latitude 61°51'N and longitude 6°50'E. Tables include daily values of the total radiation in gm cal/cm²/day for the periods June-Oct. 1941, May-Oct. 1942 and June-Sept. 1943; clear radiation for June-July and Aug.-Oct. and extreme radiation and mean radiation from con-

for each of the years of record and data on diffuse radiation from clear sky. *Subject Headings:* Global radiation data 2. Diffuse radiation 3. Olden, Nordfjord, Norway.

1946

5G-84 551.521.1(436) 551.506.1
Austria. Zentralanstalt für Meteorologie und Geodynamik, *Jahrbuch*. New Ser., v. 83, 1946, publ. 1947. DWB—Since 1938 the intensity of solar radiation upon a horizontal surface has been measured with a Robitzsch actinograph at the Hohe Warte, Vienna. The data published include: daily totals of sun and sky radiation upon a horizontal surface for July-Dec. 1946 and monthly values of total radiation for each year 1938-1946. *Subject Headings:* 1. Global radiation 2. Solar radiation intensity 3. Robitzsch actinograph 4. Vienna, Austria.

5G-85 551.521.12(47)
Kalitin, N. N., *Variatsii mesiachnykh summ tepla solnechnoi radiatsii*. [Variation of monthly sums of solar radiation.] *Meteorologiya i Gidrologiya*, 1:83-86, 1946. 2 figs., 3 tables, 5 refs. DLC—Contains data on monthly mean, maximum and minimum heat totals of solar radiation on a perpendicular and horizontal surface in cal/cm², monthly heat totals of solar radiation for May and June for each year from 1914 to 1940 on a perpendicular surface (in kg cal/cm²) and deviations (in percent) of the maximum totals of solar heat radiation from the mean monthly values at Pavlovsk. *Subject Headings:* 1. Global radiation data 2. Pavlovsk, U.S.S.R.

5G-86 551.521.1(492)
Prins, J. A. and Reesinck, J. J. M., *Meteorologische Waarnemingen te Wageningen tot 1 Januari 1946 en helderheidsmetingen aan de Hemel te Arnhem*. [Meteorological observations at Wageningen up until Jan. 1, 1946 and sky brightness measurements at Arnhem.] *Wageningen, Netherlands. Landbouwhoogeschool, Mededeelingen*, 48(3), 1946. 24 p. 17 figs., 2 tables, refs. 1. Daily sums of global radiation incident upon a horizontal surface are given for each day of the years 1942, 1943, 1944 (incomplete) and 1945 (incomplete) expressed in gm cal/cm². Decadal means and monthly totals are included. *Subject Headings:* 1. Global radiation data 2. Sky brightness 3. Wageningen, Netherlands 4. Arnhem, Netherlands.

1947

5G-87 551.508.21 551.521(47)
Kalitin, Nikolaï N., *Razvitie aktinometricheskikh rabot v SSSR v poslednie 30 let*. [Development of actinometry in the U.S.S.R. during the last 30 years.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geograf. i Geofiz.*, 11(5):433-439, 1947. chart. DLC—In addition to an historical account of actinometry in the U.S.S.R. a listing of various actinometric stations together with dates of their establishment and with length of record and actinometric research in the U.S.S.R., the article contains a map with isolines of annual distribution of total radiation in European U.S.S.R. expressed in kg cal/cm² of horizontal surface. *Subject Headings:* 1. Global radiation 2. Actinometric stations U.S.S.R.

5G-88 551.521(481)
Knudsen, Jon, *Die totale Strahlung in Bergen 1943-44*. [Total radiation in Bergen, 1943-44.] *Meteorologische Annalen*, 2(9):279-310, 1947. 9 figs., 14 tables, 3 refs., append. DWB—Continuous measurements of global radiation were made at the Bergen Meteorological Observatory (at Fredricksberg, 60°24'N, 5°19'E) from Feb. 1, 1943 to March 31, 1944. The characteristics of the Robitzsch actinograph and the calibration of the bi-metallic actinometer are discussed at length. Results of observations are then summarized and discussed in detail and illustrated graphically. Finally, a careful analysis is made of the average, extreme and individual measurements for varying conditions. The actual hourly measurements for the whole year are given in the appendix. (Same item as 5G-87, Oct. 1950, MAB.) *Subject Headings:* 1. Global radiation data 2. Robitzsch actinograph 3. Actinometers 4. Bergen, Norway.—M.R.

5G-89 551.521.1(72)
Mexico. Observatorio [Meteorológico] Central, Tacubaya. Sección de Radiación Solar, *Tables of solar radiation in Mexico*. [Preface signed Octavio R. Sandoval. Tacubaya, D. F., Sept. 19, 1947. 209 p. Almost entirely tables. Ms. Gómez, José C., *Estudios sobre radiación solar*. [Studies on solar radiation.] p. 5-32. Text and tables. MH-BH—The radiation data for Tacubaya included in this report comprise the following: bi-hourly mean monthly values of global radiation for each year from 1927-1944; mean monthly daily values of global radiation and total monthly values of global radiation for each year of the interval 1927-1944; mean daily monthly

values of diffuse radiation for the period 1930-1938. The measurements are expressed in gm cal/cm².
Subject Headings: 1. Global radiation data 2. Tacubaya, Mexico. I. Gómez, José C.

5G-90

551.521.1 (469)

551.521.1

Portugal. Serviço Meteorológico Nacional, *Anuário Climatológico. Continente e ilhas do Atlântico norte*. v. 1, 1947. DLC—Contains monthly totals and monthly maxima of global radiation at Lisbon, Serra do Pilar and Funchal. Observations are carried out at Lisbon with Moll-Gorczyński solarigraph, at Serra do Pilar with an Eppley solarigraph and at Funchal with Robitzsch solarigraph and values are expressed in kg cal/cm². *Subject Headings:* 1. Global radiation data 2. Portugal.

5G-91

551.521.1

*Richards, S. J., Solar radiation survey. Results obtained at Onderstepoort, Armoedsvlakte and Groot Drakenstein during the year 1946. South Africa, Dept. of Agriculture, Div. of Veterinary Services, Onderstepoort. [1947?] 22 p. 3 figs., 4 tables. Mimeo. DWB—The intensity of total radiation received on a horizontal surface both directly from the sun and diffusely from the sky has been recorded continuously from sunrise to sunset at these stations by self-recording instruments since the following dates: at Onderstepoort since Jan. 1940, Armoedsvlakte since Jan. 1940 and at Groot Drakenstein since March 1946. The data included in this report are: direct totals of solar and sky radiation received per unit of horizontal surface; average hourly total solar and sky radiation for each throughout the year; a comparison of the average daily amount of solar and sky radiation per month at each station; and the monthly and annual totals of solar and sky radiations and the totals expressed as a percentage of the "normal" and the "possible" amounts. The data are for one year and are expressed in gm cal/cm². *Subject Headings:* 1. Global radiation data 2. South Africa.

1948

5G-92

551.521.12 (469)

*Boerema, J., Solar radiation measurements in the Netherlands Indies. Part I. Pyrheliometer observations by eye reading from 1915-1925. Indonesia. (K.) *Magnetisch en Meteorologisch Observatorium te Batavia, Verhandelingen*, No. 34:3-14, 1948. figs., 6 tables, 5 refs., eq. A. Berlage, H. P., Jr., . . . Part II. Recording radiation of sun and sky from 1926-1941. Part II. Tables. *Ibid.*, p. 15-21, 22-47. 2 figs., tables. DWB, MH-BH—1) The radiation data for Batavia which are included in tables 1-17, inclusive, of Pt. 3 cover: mean monthly and average values of intensity of solar radiation at normal incidence in relation to solar altitude and to apparent solar time; and mean intensity of solar radiation at normal incidence reduced to mean solar distance; difference of intensity of solar radiation at Batavia P.M.-A.M., mean variation of the intensity of solar radiation with height above sea level in Java, monthly average of intensity of direct solar radiation at Batavia at noon with cloudless skies, etc. All values are expressed in cal/cm²/min. (Same item as 2.5 May 1951, MAB.) 2) Tables (18-27) include hourly total radiation of sun and sky received on a horizontal sq cm in gm cal per hour, mean daily variations of radiation of sun and sky received on a horizontal sq cm, monthly average of the radiation of sun and sky received on a horizontal sq cm, absolute monthly maximum of total radiation per sq cm. All these data cover the period 1928-1941 and data are given for each individual year; and they are all for Batavia. In addition, monthly averages of the radiation of sun and sky received on one horizontal sq cm at Soembits, at Tjiberoeg and Pangerongo on one day for 1928-1933 and 1934-1942, respectively, are given. (Same item as 5B-248, Feb. 1954, MAB.) *Subject Headings:* 1. Global radiation data 2. Solar radiation intensity 3. Batavia, Java. I. Berlage, H. P., Jr.

5G-93

551.506.1

551.521.1

Dublin Institute for Advanced Studies. School of Cosmic Physics, *Meteorological Bulletin*. Dublin City, Nov. 1948-. DWB, MH-BH—Observations of the intensity of direct solar radiation received by a surface normal to the sun's rays are made with a Kipp and Zonen pyrheliometer observations of the intensity of solar and sky radiation received by a horizontal surface with a Kipp and Zonen solarimeter for direct reading. Observations are made generally at noon and are derived from 3-7 readings. Data include the intensities of solar and sky radiation on a horizontal surface at the exact hour for each day—highest and lowest intensities during the hours and the times of the global intensities began and ceased to actuate the recorder. Values are expressed in units, which 1 unit = 0.05 millivolt = 0.00735 g cal/cm² min. *Subject Headings:* 1. Global radiation data 2. Solar radiation intensity 3. Ireland.

5G-94

551.521.1

Kalitin, N. N., *Solnechnaia i rasseiannaia radiatsiia v Tbilisi*. [Solar and diffuse radiation in Tiflis.] *Priroda*, 37 (5):33-34, May 1948. DLC—Contains data on annual incoming solar radiation.

normal incidence and upon a horizontal unit surface (119.6 kg cal, 72.6 kg cal, respectively); on diffuse radiation on a horizontal surface (49.1 kg cal) and on global radiation and a table comparing total global radiation at Tiflis (Tbilisi) with other localities along lat. 40°N (Campbell-Stokes heliograph), previously calculated normal values of solar intensity and four years of global radiation data. *Subject Headings:* 1. Global radiation 2. Diffuse radiation 3. Campbell-Stokes recorder 4. Tiflis, U.S.S.R.

5G-95 551.521.12(99)
*Peterson, Harries-Clichy, *Results of the solar radiation project of the Ronne Antarctic Research Expedition*. Ronne Antarctic Research Expedition, 1947-1948, Contract N6onr-280, Technical Report No. 3, Oct. 1948. 17 p. 7 figs., 6 tables, 9 refs. **MH-BH**—Data include weekly monthly averages and monthly maximum and minimum of total solar energy at Stonington Island, Antarctica, incident upon a horizontal surface for Oct.-Feb. 1947-1948 expressed in gm/cm². *Subject Headings:* 1. Global radiation data 2. Stonington Island, Antarctica. I. Ronne Antarctic Research Expedition, 1947-1948 II. Contract N6onr-280.

5G-96 551.521.1(43)
*Sydow, Erich, *Die Globalstrahlung in Oberstdorf und auf dem Nebelhorn*. [Global radiation in Oberstdorf and on the Nebelhorn.] *Meteorologische Rundschau*, 1(11/12):336-339, May/June 1949. 3 figs., 2 tables, 4 refs. German and English summaries p. 336. **DWB**—Data on total incoming radiation obtained at the two stations are analyzed to show variations with time of day and year, on clear and cloudy days, and between mountains and valleys. Five-day means are computed for the entire year to show how air mass movements affect the radiation climate of the northern part of the Alps. (*Same item as* 2-101, Feb. 1950, *MAB*.) *Subject Headings:* 1. Global radiation 2. Mountain meteorology 3. Nebelhorn, Germany 4. Oberstdorf, Germany.

1949

5G-97 551.521.1(431)
*Berg, Hellmut, *Die Globalstrahlung in Westdeutschland*. [The total radiation in West Germany.] *Annalen der Meteorologie*, Hamburg, 2(1/2):30-35, Jan./Feb. 1949. 5 figs., 5 tables, 10 refs. **DLC**—This paper contains average values of 6 years (1942-1948) of total radiation of sun and sky and of the sunshine for Höfchen near Burscheid (51.1°N, 7.1°E) recorded with a Robitzsch bimetallic pyranograph and a Campbell-Stokes recorder, respectively. The total radiation is expressed in kg cal/cm²/day. The mean monthly daily radiation at Höfchen is compared with that at Bochum for the years 1942, 1943 and 1944. (*Same item as* 2-99, Feb. 1950, *MAB*.) *Subject Headings:* 1. Global radiation data 2. Campbell-Stokes recorder 3. Höfchen, Germany 4. Bochum, Germany.

5G-98 551.521.1(431)
*Berg, Hellmut, *Ergebnisse von Messungen der Globalstrahlung in Bochum*. [Results of measurement of total radiation in Bochum.] *Zeitschrift für Meteorologie*, 3(5/6):153-161, 1949. 5 figs., 5 tables, 10 refs. **DWB, DLC**—Total radiation (sun and sky) has been recorded in Bochum since 1938 with a Robitzsch bimetallic pyranograph. The author presents the sums of mean daily total radiation for each month for each year from 1938-1944, annual mean of sum of daily total radiation and daily sum of total radiation for winter and summer for each year of record. Values are in gm cal/cm²/day. (*Same item as* 3-64, March 1950, *MAB*.) *Subject Headings:* 1. Global radiation data 2. Robitzsch actinograph 3. Bochum, Germany.

5G-99 551.521.1(73)
*Fritz, Sigmund and MacDonald, Torrence H., *Average solar radiation in the United States. Heating and Ventilating*, N. Y., 46(7):61-64, July 1949. 2 figs., 6 refs., 2 eqs. **MH-BH**—Average monthly amounts of solar radiation, Q , received on a unit horizontal surface over the U. S. for each month are presented in the form of isolines on maps. The relationship of Q to cloudless day radiation and percent of possible sunshine is given as a linear equation; this is followed by a discussion of use of the equation to supplement values of Q obtained by direct measurement. (*Same item as* 2-114, Aug. 1953, *MAB*.) *Subject Headings:* 1. Solar radiation 2. United States.—Authors' abstract.

5G-100 551.521.1(73)
*Hand, I. F., *Weekly mean values of daily total solar and sky radiation*. U. S. Weather Bureau, Technical Paper, No. 14, 1949. 17 p. 12 figs., 44 refs. **DWB**—Weekly mean values of daily total solar and sky radiation received upon a horizontal surface at the Weather Bureau and cooperating stations during the past 35 years. Period of record of the stations ranges from 1 to 35 years. The

values are expressed in gm cal/cm². The bibliography lists all the sources on solar radiation published by the U. S. Weather Bureau from 1914 to 1949. *Subject Headings:* 1. Global radiation 2. United States.

5G-101

551.521.1

Monthly Weather Review. Vol. 43-77, 1915-1949. DWB—Beginning with 1915 and up to 1949 inclusive the *Monthly Weather Review* contained monthly summaries of measurements of solar radiation made by the U. S. Weather Bureau at various stations distributed over the U. S. The data include monthly summaries of solar radiation intensities, daily totals and departures of sun and sky radiation at Washington, etc. The observations began to be published under the authorship of H. H. KIMBALL, later under that of I. F. HAND and subsequently without any author. *Subject Headings:* 1. Global radiation 2. Solar radiation intensity 3. United States.

5G-102

551.521.1(481) 551.5

*Schieldrup Paulsen, H., *Investigations carried through at the Station of Forest Meteorology at Os. I. On radiation, sunshine, and cloudiness.* Bergen, Universitetet. Årbok 1948, *Naturhistorisk skapelig Rekke*, No. 7, [1949.] 44 p. 19 figs., 9 tables, 34 refs., 15 eqs. MH-BH—A detailed theoretical and empirical analysis of radiation data obtained during the summers of 1944 and 1945 at Os, 30 km south of Bergen. About 20% of the sky (to the north) was covered by trees. Instruments (Robitzsch actinograph, Moll-Gorczyński solarimeter and UV dosimeter) are described in detail and comparisons with records made at Stockholm given. Numerous scatter diagrams show, respectively, the relation between global radiation and altitude of sun on clear days, between global radiation and duration of sunshine, between cloudiness and duration of sunshine, between various cloud types and global radiation. Others show the influence of albedo, effects of ultraviolet radiation in all its aspects and, finally, the daily values of global radiation for the period of record. (Same item as 7-57, July 1950, MAB.) *Subject Headings:* 1. Global radiation data 2. Ultraviolet radiation 3. Albedo of clouds 4. Os, Norway.—M.R.

5G-103

551.521.1

*Thams, J. Chr., *La radiazione del sole+cielo a Locarno-Monti. Risultati di dieci anni di osservazioni e registrazioni con l'attinografo bimetallico Fuess Robitzsch.* [Sun and sky radiation at Locarno-Monti. Results of ten years of records with a bimetallic Fuess-Robitzsch actinograph.] *Geografia Pura e Applicata*, Milan, 14(1/2):1-16, 1949. 4 figs., 7 tables, 21 refs. DWB, DLC—In the analysis of the total radiation from sun and sky incident upon a horizontal surface recorded in 1938 with the bimetallic actinograph Fuess-Robitzsch, the following data are presented: sun mean daily total radiation on days without clouds, sum of mean daily total radiation on days with sun for each month for the decade 1938-1948 at Locarno-Monti at Zurich and Davos; also monthly values of daily total radiation at Locarno-Monti (1938-1948), Zurich (1938-1942) and Davos (1935-1941) are given. All the values are in gm cal/cm²/day. *Subject Headings:* 1. Global radiation data 2. Locarno-Monti, Switzerland 3. Zurich, Switzerland 4. Davos, Switzerland

5G-104

551.521.1(7)(729.5)

†U. S. Weather Bureau, *Weekly mean values of daily total solar and sky radiation.* Weather Bureau, Technical Paper, No. 11, 1949. 17 p. 12 figs., 44 refs. DWB—The weekly means and the annual march of daily totals of sun and sky radiation received on a horizontal surface are given for all stations in the U. S., Hawaii, Alaska, Canada and Puerto Rico are presented graphically. *Subject Headings:* 1. Global radiation 2. United States 3. Hawaii 4. Alaska 5. Canada 6. Puerto Rico.

5G-105

551.521.1:523.7

*Yamamoto, G.; Yamamoto, S. and Sato, B., *Observations of solar and sky radiation.* *Geophysical Magazine*, Tokyo, 19(3/4):66-72, Dec. 1948. 3 figs., 4 tables, 2 refs. In English. MH-BH—The intensity of solar radiation during the eclipse of May 9, 1948, was measured with Moll-Gorczyński type actinometers and it was recorded on Yokokawa's moving coil galvanometer. Data on the intensity of solar radiation during the eclipse are given. The limb darkening of the solar disc was investigated by the method used by W. H. JULIUS. The radiation at various distances from center of solar disc is calculated and a curve resembling that obtained by W. H. JULIUS in 1912 is given. (Same item as 2.4-95, July 1951, MAB.) *Subject Headings:* 1. Solar radiation intensity 2. Global radiation data 3. Eclipses 4. Japan.

1950

5G-106

551.521.1(7)

Crabb, George A., Jr., *The normal pattern of solar radiation at East Lansing.* Michigan Agricultural Experiment Station, Journal, Article No. 1144, [March 24, 1950]. 5 p. 4 refs.

—Five years of solar radiation data for East Lansing, Michigan, were smoothed and averaged to determine the normal pattern of daily radiation available for plant growth. Compared with 92 other stations, Lansing showed lower annual totals than any other station except Fairbanks, Pittsburgh, Chicago and New York. (The three latter are affected by atmospheric pollution.) A singularity exists from April 25 to May 20, not evident in other records. Lower radiation at this season has a marked effect on tomato and apple development. (*Same item as 2.1-93, Feb. 1951, MAB.*) *Subject Headings:* 1. Global radiation 2. Agricultural meteorology 3. East Lansing, Michigan.—*R.*

5G-107 551.521.1(774)
*Crabb, George A., Jr., *Solar radiation investigations in Michigan*. Michigan. Agricultural Experiment Station, East Lansing, Technical Bulletin, No. 222, Oct. 1950. 153 p. 49 figs., 10 tables, bibliog. DWB—Solar and sky radiation were measured with an Eppley pyrheliometer during the entire year of 1947. The data (in tabular form) on solar and sky radiation are given in gm cal/cm² of horizontal surface for every hour of apparent time. In addition the following data are presented in graphical form: total daily solar and sky radiation measured at East Lansing for 1943, 1944, 1945, 1946 and 1947. Normal daily total solar and sky radiation at East Lansing is compared with that at the various radiation stations in the U. S. Weather Bureau radiation network. (*Same item as 2.8-78, Aug. 1951, MAB.*) *Subject Headings:* 1. Global radiation data 2. East Lansing, Mich. 3. United States.

5G-108 551.521.1(43) 551.521.3(43)
Falckenberg, G. and Bolz, H. M., *Jahresgang der Einstrahlung für Warnemünde*. [Annual variation of incoming radiation at Warnemünde.] *Zeitschrift für Meteorologie*, 4(3):65-66, March 1950. 2 figs. MH-BH—Hourly or $\frac{1}{2}$ -hourly measurements were made continuously (day and night) from April 1, 1947 to March 31, 1948 in Warnemünde of long wave radiation from the atmosphere and direct and diffuse solar radiation. Annual variation shown in Fig. 1, no tables. Fig. 2 shows annual variation of sunshine, cloud, temperature and vapor pressure. (*Same item as 10-86, Oct. 1950, MAB.*) *Subject Headings:* 1. Diffuse radiation 2. Global radiation 3. Direct solar radiation 4. Warnemünde, Germany.—*C.E.P.B.*

5G-109 551.506.1:551.521.1(058)
*Japan. Central Meteorological Observatory, Tokyo, *Actinometric Bulletin*. First issue received No. 21, 1943; last issue received No. 28, 1950. DWB—Observations of radiation from the whole sky with the Robitzsch actinograph were begun in Japan in 1931. The number of stations increased from 8 in 1935 to 40 in 1940 and to 60 in 1945; after 1945 they decreased to about 30, the number in operation now. The tables contain 5 day means of hourly radiation amounts and of the total daily amounts from the whole sky (solar and sky radiation) upon a horizontal surface. The data are expressed in gm cal/cm². (*Same item as 4.3-44, March 1953, MAB.*) *Subject Headings:* 1. Global radiation 2. Robitzsch actinograph 3. Japan.

5G-110 551.521.1(058)
Japan. Central Meteorological Observatory, Tokyo, *Pyrheliometric Bulletin*. First issue received 1939, publ. 1952; last number received 1950, publ. 1951. In English, title page in English, and Japanese. DWB—Observations of direct solar radiation began in 1932 in Japan. At present about 30 stations are equipped with Abbot type silver-disk pyrheliometers constructed by the Central Meteorological Observatory (CMO), Tokyo. Results are compared with standard instrument at CMO. Annual reports give extensive data for each month and stations, when sky is clear at 9 h, 12 h and 15 h local time. The parameters I , sec Z , I/I_0 , A , b , t , e , N and T_0 (Feussner and Dubois coefficient of turbidity). The 1939 issue contains data for stations in Korea, Sakhalin and for Dairen, Saipan and Ponape. (*Same item as 4.2-129, Feb. 1953, MAB.*) *Subject Headings:* 1. Pyrheliometric data 2. Solar radiation networks 3. Annual meteorological reports 4. Korea 5. Sakhalin 6. Dairen 7. Saipan 8. Ponape.—*M.R.*

5G-111 551.521.3(47)
*Kaltin, N. N., *Summarnaia radiatsiia v Pavlovsk*. [Total radiation at Pavlovsk.] *Leningradskaya Geofizicheskaya Observatoriia, Trudy*, 19(81):133-160, 1950. 15 figs., 14 tables, 8 refs. DLC—Actinometric observations began at Pavlovsk (near Leningrad) in 1890 and were continued without interruption until Aug. 1941. The enormous mass of data accumulated during that time has been analyzed from time to time by the author (who died recently) and the results of these analyses are summarized in this important paper. Total radiation with no cloud, and with various types or amounts of cloud, is considered. Diurnal and seasonal variations in total (direct and diffuse) solar radiation, and variation with changing solar angle, are analyzed graphically and data given in tables. The annual variation in the various types of radiation is also shown graphically.

ically. (Same item as 2.7-97, July 1951, MAB.) *Subject Headings:* 1. Solar radiation 2. Global radiation data 3. Pavlovsk, U.S.S.R.—M.R.

5G-112

551.521.1

Kawabata, Y. and Fujito, M., *Distribution of total horizontal insolation in Japan and its neighborhood*. *Geophysical Magazine*, Tokyo, 22(2):143-155, Nov. 1950. 7 figs., table, 3 refs. English. **MH-BH**—By the end of 1944 at least 60 stations in Japan had been equipped with simple actinographs. Records from 50 of these stations for 1 to 15 years, although not consistent (due to changes in constants or deterioration of the equipment), have been summarized and analyzed statistically in many ways. Relation of insolation to cloud amount, to season and region, to vapor pressure and between land and ocean are presented in tables and charts, and discussed briefly. (Same item as 2.3-82, March 1951, MAB.) *Subject Headings:* 1. Insolation 2. Japan.—M.R.

5G-113

551.521.1

*Stagg, J. M., *Solar radiation at Kew Observatory*. *Great Britain. Meteorological Office. Geophysical Memoirs*, No. 86, 1950. 37 p. 14 figs., 24 tables, 15 refs. **MH-BH**—A summary of records of direct solar radiation received on a surface maintained normal to the direction of radiation for the period 1933-1945 and of measurements of the radiation received on a horizontal surface from the sun and sky for the period July 1946-Aug. 1947. All measurements were made at Kew Observatory. The data include: monthly totals of direct radiation, including maxima and minima recorded during period of record; annual totals of direct radiation; monthly means of daily totals for various categories of days, intensity of direct radiation for all days 1933-1946, radiation intensity as a function of solar elevation and of air mass; monthly totals and daily means of total and diffuse radiation on a horizontal surface and at direct (normal) incidence for 1946-1947, and their extreme values, etc. (Same item as 11-85, Nov. 1950, MAB.) *Subject Headings:* 1. Global radiation 2. Short wave radiation 3. Direct solar radiation intensity 4. Kew Observatory, England.

5G-114

551.506.1 551.521.12(7)

*U. S. Weather Bureau, *Climatological data. National summary*. v. 1, No. 1, Jan. 1951. **DWB**—The solar radiation data previously published in the *Monthly Weather Review* appear in this Climatological Bulletin. The daily totals and weekly averages of solar radiation (diffuse and diffuse) received upon a horizontal surface are recorded at 65 stations and are published monthly. Stations include Hawaii, Alaska and Western Canada. *Subject Headings:* 1. Global radiation 2. United States.

1951

5G-115

551.506.1 551.521.1(6)

Algiers. Université. Institut de Météorologie et de Physique du Globe, *Annuaire météorologique et Géophysique, Sahara*, 1951, publ. 1953. **DWB**—Data on radiation consist of monthly values of intensity recorded with a Gorczyński solarigraph compared to a modified Dupont actinometer. Table gives mean monthly values of global radiation in gm cal/cm² for each hour, mean monthly and daily values of global radiation. *Subject Headings:* 1. Global radiation 2. Solar radiation intensity 3. Gorczyński solarigraph 4. Sahara Desert.

5G-116

551.521.1

*Drummond, A. J. and Kirsten, M. K. (S. Africa Weather Bureau, Pretoria), *Measurements of solar radiation in South Africa*. *South African Journal of Science*, Pretoria, 48(3):103-110, 1951. fig., 3 tables, 8 refs. **DWB, DLC**—Records of the short wave radiation received horizontally from the sun and the sky and diffused from the sky alone have been maintained at Pretoria since 1951. Radiation was recorded with a Kipp thermoelectric solarimeter coupled to twin continuously-registering microammeters. The data include: frequency distribution of hourly and daily values of the total and diffuse radiation at Pretoria, Jan.-June 1951 and graphs showing the variability of daily totals of sun and sky radiation in the Union of South Africa and Bechuanaland 1947 at Messina, Onderstepoort, Armoedsvlakte and Groot Drakenstein. (Same item as 3.9-Sept. 1952, MAB.) *Subject Headings:* 1. Global radiation data 2. Kipp solarimeter 3. South Africa.

5G-117

551.521.12

*Sweden. Meteorologiska och Hydrologiska Institut, *Månadsöversikt över väderlek och vattentillgång*, 1951. [Monthly review of weather and hydrology, 1951.] Sweden. Meteorologiska och Hydrologiska Institut, *Årsbok*, v. 33, Pt. I, 1951. 84 p. charts, tables. **DLC**—Global radiation from sun and sky is recorded at Stockholm with a Kimball pyranometer. The published data include total monthly global radiation for each month and are expressed in gm cal/cm². *Subject Headings:* 1. Global radiation data 2. Stockholm, Sweden.

1952

5G-118 551.506.1 551.521.1(436)
Austria. Zentralanstalt für Meteorologie und Geodynamik, *Jahrbuch*. New Ser., v. 89, 1952.
ria. *Zentralanstalt für Meteorologie und Geodynamik, Publikation* No. 165, 1953. DWB—The
r radiation data included in this annual report are as follows: Vienna Hohe Warte—daily totals
un and sky radiation upon a horizontal surface and daily totals of sky radiation upon a horizontal
ace expressed in kg cal/cm² recorded with a Stern pyranometer. In addition, monthly and
ual totals of solar radiation recorded with a Robitzsch actinograph are given for the following
ions: Innsbruck Univ., Renn, Wattener Lozum, Bärnkopf, Lunz am See, Petzenkirchen, Sem-
ing, Neusiedl am See, Admant and Zirbitzkagel. *Subject Headings*: 1. Global radiation
ustria.

5G-119 551.521(68)
Drummond, A. J., *Progress report on the implementation of a radiation service in the Weather
ureau of the Union of South Africa*. 1952. DWB, MH-BH—A report on the accomplishments of
Radiation Service formed within the Weather Bureau of the Union of South Africa in Oct.
9 in order to maintain a network of solar radiation stations distributed throughout the Union
South Africa and Bechuanaland. The report covers the period 1949-1952. The following
ions providing continuous hourly values of total and of diffuse sky radiation received on a hori-
tal surface were established during 1951: Pretoria, Durban, Windhoek and Cape Town. A
sidary station providing daily values of total radiation only, was opened at Maun during the
ne year. By Dec. 1952 it was expected to increase the main stations to 7 and secondary stations
10-12. The ultimate solar radiation network aimed at would include: main stations at Pretoria,
emfontein, Cape Town, Durban, Maun, Port Elizabeth and Windhoek; subsidiary stations at
ot Drakenstein, Alexander Bay, Beaufort West, East London, Kimberley, Ladysmith, Neilspruit,
orge, Pietersburg, Johannesburg, Uppington, Ketmanshoup and Walvis Bay. The main stations
equipped with thermoelectric solarimeters (Kipp-Moll) and the secondary stations with a bi-
talic instrument of the Robitzsch type. Serial daily values of total radiation for Pretoria,
urban, Windhoek and Cape Town are published regularly in the Monthly Weather Report since
1. (See Annual Report 1951.) *Subject Headings*: 1. Global radiation 2. Solar radiation net-
rks 3. South Africa.

5G-120 551.506.1 551.521.12(495)
*Greece. Ethnikon Asteroskopeion Athēnōn. Meteorological Institute, *Monthly Climatological
ulletin*. v. 1, No. 1, Jan. 1952. entirely data. DWB—In addition to the usual meteorological
a this bulletin gives solar radiation data including: diurnal march of total solar radiation in gm
/cm²/min obtained from a Gorczyński solarigraph; and daily registration at 11 h 20 min of total
ar radiation and of direct radiation measured with Kipp-Zonen solarimeter for direct reading
d with Kipp-Zonen pyr heliometer with filters, respectively, expressed in gm cal/cm²/min. *Subject
adings*: 1. Global radiation data 2. Athens, Greece.

5G-121 551.521.1(744)
*†Hand, I. F. and Wollaston, F. A., *Measurements of diffuse solar radiation at Blue Hill Ob-
servatory*. U. S. Weather Bureau, *Technical Paper*, No. 18, May 1952. 19 p. 3 figs., 2 tables,
refs., bibliog. DWB—The authors summarize four years of record (1946-1949) of diffuse solar
iation, obtained by means of a pyranometer "equipped with an occulting ring which shades the
ceiving surface from the sun and prevents practically all of the diffuse radiation to impinge upon
e instrument." The data are presented graphically and tabularly—giving daily values of diffuse
iation, daily totals of solar and sky radiation, weekly mean daily value of diffuse radiation, yearly
al diffuse radiation, yearly total solar and diffuse radiation, yearly mean daily diffuse radiation
d yearly mean daily total of sky and diffuse radiation, expressed in langley's per day. A selected
ibliography on diffuse radiation is included. (Same item as 4.5-110, May 1953, M.A.B.) *Subject
adings*: 1. Diffuse radiation 2. Blue Hill, Mass.

5G-122 551.506.3:551.521.1(431)
Hinzpeter, H., *Neue langjährige Reihe der Globalstrahlung in Potsdam*. [New long series
global radiation in Potsdam.] Germany. *Deutscher Wetterdienst in der US-Zone, Berichte*,
p. 42:86-87, 1952. 2 tables, 3 refs. DWB—Five-year means are given for each month (cal/cm²/
y) 1893-1940. Correlations with air temperature range from -.035 (Dec.) to +0.85 (Sept.).
bjeet Headings: 1. Global radiation 2. Potsdam, Germany.—C.E.P.B.

5G-123

551.521.1(4)

*Maede, Hans and Matzke, H., *Die Globalstrahlung im Zusammenhang mit typischen Wetterlagen, dargestellt am Beispiel von Greifswald*. [Global radiation in relation to typical weather conditions as presented at Greifswald.] *Zeitschrift für Meteorologie*, 6(1):15-22, Jan. 1952. 4 tables, 4 refs. **MH-BH**—The daily record of global radiation at Greifswald measured with Robitzsch pyranograph over a period of 20 years has been summarized into decads and the annual variation of global radiation is analyzed. All days on which global radiation was measured are classified into twelve weather types (defined by H. MEADE) and their monthly and annual frequency distributions are given. The annual variation of the specific, absolute, relative and standard deviation of mean radiation of a particular weather type from mean monthly global radiation for each of these weather types expressed in monthly means is given in tables and the radiation characterizing these weather types is analyzed. The effect of the coastal climate of Greifswald on the global radiation and the bioclimatic significance of the radiation climate are discussed. (Same item as 3.11-128, Nov. 1952, *MAB*.) *Subject Headings*: 1. Global radiation data 2. Weather types 3. Robitzsch actinograph 4. Greifswald, Germany.

5G-124

551.521.1(4)

*Schedler, A., *Ein Beitrag zur Kenntnis der Global- und Himmelsstrahlung im Hochgebirge Alpen*. (Nach Messungen in Hochserfaus, 1817 m.) [A contribution to the knowledge of global and sky radiation in the High Alps (from measurements in Hochserfaus, 1817 m).] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 4(1):14-25, 1952. 3 figs., 8 tables, 7 refs. German, English and French summaries p. 14-15. **DWB**—Observations were made with 2 Robitzsch actinographs. Table gives monthly values of global radiation on a horizontal surface, solar radiation allowing for cloudiness, difference (=sky radiation) and sunshine duration in %. Comparisons made with Davos and with values at 3000 m. Relation of sky/global radiation at different sea levels is calculated for different sunshine percentages (0-100); the relation is not linear. Sky radiation much greater in spring than autumn, owing to reflection from snow surfaces. A method of calculating radiation amount for constant cloudiness is described. (Same item as 3.10-13, Oct. 1952, *MAB*.) *Subject Headings*: 1. Radiation calculations 2. Global radiation data 3. Alps.—C.E.P.B.

5G-125

551.521.1(4)

*Schieldrup Paulsen, H., *Global radiation in Bergen*. *Bergen. Universitets. Årbok, Naturvidenskapelig Rekke*, No. 9, 1952. 29 p. 10 figs., 5 tables, 18 refs. **DWB**—The total radiation from sun and sky on a horizontal surface has been recorded from Oct. 1945 to Sept. 1950 with Robitzsch actinograph. A table gives mean monthly values of total radiation for each hour and mean monthly totals for 1945-50 in $\text{gm cal cm}^{-2} \text{ min}^{-1}$ and $\text{gm cal cm}^{-2} \text{ day}^{-1}$, respectively. Graphs show mean daily variation of global radiation for each month, isopleths of global radiation in Bergen (1945-1950), mean annual variation of global radiation on clear days and on all days, monthly deviation of global radiation and cloudiness from five year monthly means during the different years, 1945-50, annual variation of global radiation income in Bergen and Stockholm, etc. (Same item as 4.6-119, June 1953, *MAB*.) *Subject Headings*: 1. Global radiation data 2. Robitzsch actinograph 3. Bergen, Norway.

5G-126

551.521.1(4)

*Schindler, G., *Registrierungen der Globalstrahlung in NW-Böhmen*. [Records of global radiation in NW Bohemia.] *Meteorologische Rundschau*, 5(3/4):50, March/April 1952. 2 tables. **DWB**—Total radiation was recorded with a Robitzsch actinograph at Podersam (50°13'N, 13°32' E, 320 m) over the period 1941-1945. Tables give mean monthly totals, mean monthly maximum and minimum and absolute daily maximum and minimum of total radiation for the period 1941-1945 expressed in $\text{gm cal/cm}^2/\text{min}$. (Same item as 4.2-135, Feb. 1953, *MAB*.) *Subject Headings*: 1. Robitzsch actinograph 2. Global radiation data 3. Podersam, Czechoslovakia.

1953

5G-127

551.521.1(431) 551.521.1(431)

*Hinzpeter, Hans, *Studie zum Strahlungsklima von Potsdam*. [Study of the radiation climate of Potsdam.] *Germany. Deutsche Demokratische Republik, Meteorologischer und Hydrologischer Dienst, Veröffentlichungen*, No. 10, 1953. 72 p. 14 figs., 29 tables, 28 refs. **DWB**—Previous studies on the radiation climate of Potsdam are reviewed; turbidity factors for normal intensity values determined by MARTEN and DORFWIRTH for Potsdam (monthly means of morning and noon values for 5° intervals of solar elevation) are given, and the instruments for measuring radiation used at Potsdam are described. The climatological radiation data for Potsdam in 1952 are given, daily means of global radiation and of sky radiation for different sky conditions ($\text{cal cm}^{-2} \text{ day}^{-1}$).

n hourly sums of total radiation and of sky radiation based on the means of all days for the period 1917-1942, and mean hourly sums of total and of sky radiation based upon clear days for the period 1917-1942 (all in $\text{cal cm}^{-2} \text{ hour}^{-1}$), hourly and annual distribution of H_0/Q_0 (diffuse sky radiation as daily means of radiation days); clear days and of H/Q (daily means of sky radiation and daily means of total radiation on all days); absolute extreme values of sky radiation and of total radiation ($\text{cm}^{-2} \text{ day}^{-1}$); frequencies of daily sums of total radiation and of sky radiation for 1937-1942; the dependence of sky radiation upon sunshine duration; and mean monthly daily totals of radiation for each year from 1893 to 1940. A comparison is made between radiation at Potsdam and at Nice, Davos, Karlsruhe, Rothamstead, Gdansk (Danzig), Stockholm and Helsinki; for all these, mean daily sums of total radiation on radiation days and mean monthly daily totals of radiation are given. *Subject Headings:* 1. Global radiation data 2. Turbidity factor 3. Diffuse radiation 4. Potsdam, Germany.

5G-128 551.521.1(431)
 *Matzke, Horst, *Beiträge zur Kenntnis der Globalstrahlung in Greifswald*. [Contribution to knowledge of global radiation in Greifswald.] Germany. *Deutsche Demokratische Republik, Meteorologischer und Hydrologischer Dienst, Abhandlungen*, No. 16, 1953. 64 p. 22 figs., 13 tables, 10 refs. DWB—Observational methods at Greifswald ($54^{\circ}6'N$, $13^{\circ}23'E$) with Robitzsch global radiation recorder are described. Monthly and annual sums 1931-51 are tabulated. Annual radiation by pentads is examined for cloudless, overcast and all days. ÅNGSTRÖM's formula is quoted in the modified form $Q_s = Q_1(0.2-0.07 S)$, Q_1 =global radiation on cloudless days, S =sunshine duration %, which agrees with observed values within 10%. Global radiation is also related to cloud data. Data for other European stations are compared and variation of the constants discussed. Global radiation at Greifswald is analyzed into diffuse sky (43%) and direct solar (57%) radiation on a horizontal surface; the effect of sun height is examined. (*Same item as 4.8-117*, p. 1953, MAB.) *Subject Headings:* 1. Global radiation data 2. Robitzsch actinograph 3. Greifswald, Germany.—C.E.P.B.

5G-129 551.521.12(768)
 *U. S. Weather Bureau, *Meteorological survey of the Oak Ridge area. Final Report covering period 1948-1952*. U. S. Atomic Energy Commission, ORO-99, Nov. 1953. 584 p. 181 figs., 13 tables, 107 refs., eqs. DWB—A climatological record of four years (1949-1952) of solar radiation registered with a standard Eppley 10-function pyrheliometer is presented. Data include mean monthly value of daily total radiation incident upon a horizontal surface expressed in gm cal/cm^2 . *Subject Headings:* 1. Global radiation data 2. Solar radiation intensity 3. Eppley pyrheliometer 4. Oak Ridge, Tenn.

1954

5G-130 551.521.1(661)
 Masson, H., *Contribution à l'étude de l'échauffement de l'eau sous l'effet de la radiation solaire* (note). [Contribution to the study of warming of water under the influence of solar radiation (note).] Dakar. *Institut des Hautes Études. École Supérieure des Sciences, Annales*, v. 1, no. 54, 23 p. table. Abstracted from reprint. DWB—This article contains (append. p. 16-17) series of irregular daily observations of global radiation for Hann (near Dakar) for March 1952-June 1952. They were made with a Gorczyński solarimeter and are expressed in gm cal/cm^2 . *Subject Headings:* 1. Global radiation 2. Dakar, French West Africa.

PART III (a). SPECIAL UNANNOTATED BIBLIOGRAPHY ON CLOUD PHYSICS

By: *Committee on Cloud Physics, American Geophysical Union. Helmut Weickmann, Chairman; Charles E. Anderson; George S. Benton; Roscoe R. Braham; Ferguson Hall, and Christian Junge.*

In this section we are departing from our usual policy of printing only annotated bibliography in order to present to the reader, as soon as possible, a comprehensive, but selective, list of researches in several fields of Cloud Physics prepared by H. WEICKMANN and his Committee on Cloud Physics.

The bibliography was prepared in the spring of 1954 in connection with a report to the American Geophysical Union on Progress in Cloud Physics, 1951-53 by the Chairman of the Committee on Cloud Physics of the Section of Meteorology. This report, which is being published in the August 1954 issue of the *American Geophysical Union, Transactions*, p. 637 to 644, contains specific references to most of the papers cited herein, by author and date under the sub-section of the Report (WOODCOCK, 1952 in **B. Papers on Nuclei**).

Those papers which have been abstracted and for which the abstracts have already been published in *Meteorological Abstracts and Bibliography* are referred to by abstract number. For instance STOMMEL (1951) in Section **D** carries the reference 2.11-140 which means that an abstract will be found in Part I of Vol. 2, No. 11, Nov. 1951, of *Meteorological Abstracts and Bibliography*. A letter (e.g., **3K**) refers to an abstract in a Special Bibliography (Part II) of the issue whose number (roman numeral) corresponds to the numerical order of the letter (e.g., **A**=1 (Jan.), **C**=3 (March) and **K**=11 (November)).

A few items which are designated (*unchecked*) have not been located in the few days our publication schedule permitted for checking and preparing copy for the printer. *No attempt has been made to include all the literature prior to 1951.*

We wish to thank **Mr. Waldo E. Smith**, Executive Secretary of the American Geophysical Union as well as the chairman, **Dr. Weickmann**, for giving us the opportunity to publish this valuable contribution. At some later date a more complete and annotated bibliography on Cloud Physics will be published to supplement that which appeared in Vol. 1, No. 3 (March 1950) of *Meteorological Abstracts and Bibliography*.

The subjects covered in this report are:

- A** Books and Outstanding Reviews
- B** Papers on Nuclei
- C** Papers on Formation and Properties of Cloud Particles
- D** Papers on Formation and Properties of Clouds
- E** Papers on Natural Precipitation
- F** Papers on Artificial Precipitation and Cloud Modification
- G** Papers on Thunderstorms, Hailstorms, Tornadoes, and Thunderstorm Electricity
- H** Papers on Radar and Cloud Physics Research

A. BOOKS AND OUTSTANDING REVIEWS

- Byers, Horace R. (ed.), *Thunderstorm electricity*. Univ. of Chicago Press, 1953. 344 p. (MAB 4.10-12)
- Flora, S. D., *Tornadoes of the United States*. Norman, Okla., Univ. of Oklahoma Press, 1944. 194 p. (MAB 4.8-8)
- Junge, Christian, *Die Konstitution des atmosphärischen Aerosols*. [The constitution of atmospheric aerosol.] *Annalen der Meteorologie, Beiheft*, 1952. 55 p. (MAB 4.3-9)
- Ludlam, F. H. and Scorer, R. S., *Convection in the atmosphere*. *Royal Meteorological Society Quarterly Journal*, 79 (341):317-341, July 1953. (MAB 4.11-2)
- Malkus, Joanne Starr, *Recent advances in the study of convective clouds and their interaction with the environment*. *Tellus*, 4 (2):71-87, May 1952. (MAB 3.10-222)
- Malone, Thomas F. (ed.), *Compendium of Meteorology*. Boston, American Meteorological Society, 1951. 1334 p. (MAB 3.3-1)
- Mason, B. J. and Ludlam, F. H., *The microphysics of clouds*. *Physical Society of London Reports on Progress in Physics*, 14:147-195, 1951. (MAB 3.3-173)

- Schaefer, Vincent J., **Laboratory, field and flight experiments.** General Electric Research Lab. Project Cirrus, Final Report, Pt. I, March 1953. 170 p.
- Wormell, Thomas Wilson, **Reviews of modern meteorology—8. Atmospheric electricity; some recent trends and problems.** *Royal Meteorological Society, Quarterly Journal*, 79 (339):3–38, Jan. 1953. (MAB 4.7–217)

PAPERS ON NUCLEI

- aufm Kampe, Hans Joachim; Weickmann, Helmut K.; Kedesdy, H. H. and Motoi, Kumai, **Remarks on "Electron-microscope study of snow-crystal nuclei."** *Journal of Meteorology*, 9(5):374–376, Oct. 1952. (MAB 4.2–182)
- Boyce, Steve G., **Source of atmospheric salts.** *Science*, 113(2944):620–621, June 1, 1951. (MAB 3.6–63)
- Crozier, William Dwight; Seely, Ben K. and Wheeler, L. B., **Correlation of chloride particle abundance with the synoptic situation on a cross-country flight.** *American Meteorological Society, Bulletin*, 33(3):95–100, March 1952. (MAB 4.2–84)
- Crozier, W. D.; Seely, Ben K. and Thompson, A. H., **A second chloride cloud in California.** *American Meteorological Society, Bulletin*, 33(4):177–178, April 1952. (MAB 4.2–183)
- Dessens, Henri; Lafargue, C. and Stahl, P., **Nouvelles recherches sur les noyaux de condensation.** [New research on condensation nuclei.] *Annales de Géophysique*, 8(1):21–32, Jan./March 1952. (MAB 4.9–158)
- Facy, L., **Embruns et noyaux de condensation.** [Condensation nuclei from spray.] *Journal Scientifique de la Météorologie*, 3(10):62–68, April/June 1951. (MAB 3.11–132)
- Facy, L., **Éclatement des lames minces et noyaux de condensation.** [Bursting of thin films and condensation nuclei.] *Journal Scientifique de la Météorologie*, 3(11):86–98, July/Sept. 1951. (MAB 3.11–175)
- Facy, L., **Forme des microcristaux dans les noyaux de condensation.** [Form of microcrystals in condensation nuclei.] *Journal Scientifique de la Météorologie*, 4(13):9–19, Jan./March 1952. (MAB 4.2–184)
- Hess, Victor F., **Further determination of the concentration of condensation nuclei in the air over the North Atlantic.** *Journal of Geophysical Research*, 56(4):553–556, Dec. 1951. (MAB 4.10–191)
- Hosler, Charles L.; Burkhart, Marvin D. and Neuberger, Hans, **On the effect of time lapse between sampling and expansion in the Aitken nuclei counter.** *American Meteorological Society, Bulletin*, 33(6):251–254, June 1952.
- Jacobi, W.; Junge, Christian and Lippert W., **Reihenuntersuchungen des natürlichen Aerosols mittels Elektronenmikroskops.** [Serial investigations of natural aerosols by the electron microscope.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 5(2):166–178, 1952. (MAB 4.4–185)
- Junge, Christian, **Gesetzmäßigkeiten in der Größenverteilung atmosphärischer Aerosole über dem Kontinent.** [Regularities in the large scale distribution of atmospheric aerosols over the continent.] *Germany. Deutscher Wetterdienst in der U.S.-Zone, Berichte*, No. 35:261–277, 1952. (MAB 3.11–177)
- Junge, Christian, **Die Rolle der Aerosole und der gasförmigen Beimengungen der Luft im Spurenstoffhaushalt der Troposphäre.** [The role of aerosols and gaseous impurities of the atmosphere in the chemical balance of the troposphere.] *Tellus*, 5(1):1–26, Feb. 1953.
- Kumai, Motoi, **Electron-microscope study of snow-crystal nuclei.** *Journal of Meteorology*, 8(3):151–156, June 1951. (MAB 3.4–210)
- Kuroiwa, Daisuke, **Electron-microscope study of fog nuclei.** *Journal of Meteorology*, 9(3):157–160, June 1951. (MAB 3.6–135)
- Kuroiwa, Daisuke, **Electron-microscope study of atmospheric condensation nuclei.** (In: Sapporo, Japan. Hokkaido Univ. Inst. of Low Temperature Science, *Studies on fogs in relation to fog-preventing forest*. 1953. p. 349–382.) (MAB 5.6–203)
- Moore, D. J., **Measurements of condensation nuclei over the North Atlantic.** *Royal Meteorological Society, Quarterly Journal*, 78(338):596–602, Oct. 1952. (MAB 4.2–186)
- Ogiwara, S. and Okita, T., **Electron-microscope study of cloud and fog nuclei.** *Tellus*, 4(3):233–240, Aug. 1952. (MAB 4.9–163)
- Ohta, S., **On the contents of condensation nuclei and uncharged nuclei on the Pacific Ocean and the Japan Sea.** *American Meteorological Society, Bulletin*, 32(1):30–31, Jan. 1951. (MAB 2.9–119)
- Parkinson, W. C., **Note on the concentration of condensation nuclei over the Western Atlantic.** *Journal of Geophysical Research*, 57(2):314–315, June 1952. (MAB 4.8–171)
- Schaefer, Vincent J., **The Mount Washington Observatory for field research.** *Mount Washington Observatory, News Bulletin*, No. 22:15–17, June 1953.

- Thomsen, Warren J., The annual deposit of meteoritic dust. *Sky and Telescope*, 12 (6):147-148, April 1953.
- Woodcock, Alfred H., Atmospheric salt particles and raindrops. *Journal of Meteorology*, 9 (3):200-212, June 1952. (MAB 3.11-184)
- Woodcock, Alfred H., Salt nuclei in marine air as a function of altitude and wind force. *Journal of Meteorology*, 10 (5):362-371, Oct. 1953. (MAB 5A-197)

C. PAPERS ON FORMATION AND PROPERTIES OF CLOUD PARTICLES

- aufm Kampe, H. J.; Weickmann, H. K. and Kelly, J. J., The influence of temperature on the shape of ice crystals growing at water saturation. *Journal of Meteorology*, 8 (3):168-171, June 1951. (MAB 3.5-231)
- aufm Kampe, Hans Joachim, Feuchtigkeitsverhältnisse in Cirruswolken und die daraus resultierenden Formen der Eiskristalle. [Humidity conditions in cirrus clouds and the resulting forms of ice crystals.] Germany. *Deutscher Wetterdienst in der U.S.-Zone*, Berichte, No. 38:298-302, Weickmann-Heft. 1952. (MAB 4.2-181)
- aufm Kampe, H. J. and Weickmann, Helmut K., The effectiveness of natural and artificial aerosols as freezing nuclei. *Journal of Meteorology*, 8 (5):283-288, Oct. 1951. (MAB 3.4-183)
- Best, A. C., The evaporation of raindrops. *Royal Meteorological Society, Quarterly Journal*, 78 (336):200-225, April 1952. (MAB 3.8-152)
- Best, A. C., Effect of turbulence and condensation on drop-size distribution in cloud. *Royal Meteorological Society, Quarterly Journal*, 78 (335):28-36, Jan. 1952. (MAB 3.4-184)
- Bigg, E. K., The supercooling of water. *Physical Society, Proceedings, Sec. B*, 66 (8):No. 46:688-694, Aug. 1, 1953. (MAB 5.3-239)
- Birstein, S. J., The effect of relative humidity on the nucleating properties of photolyzed silver iodide. *American Meteorological Society, Bulletin*, 33 (10):431-434, Dec. 1952. (MAB 4.8-65)
- Birstein, Seymour J. and Anderson, Charles E., Preliminary report on sea salt as an ice nucleus. *Journal of Meteorology*, 10 (2):166, April 1953. (MAB 4.8-166)
- Blanchard, Duncan C., A verification of the Bally-Dorsey theory of spicule formation of silver iodide pellets. *Journal of Meteorology*, 8 (4):268-269, Aug. 1951. (MAB 3.6-147)
- Brewer, Alan W. and Palmer, H. P., Freezing of supercooled water. *Physical Society, Proceedings, Sec. B*, 64:765-773, 1951.
- Dorsch, Robert G. and Boyd, Bemrose, X-ray diffraction study of the internal structure of supercooled water. *U. S. NACA, Technical Note*, 2532, Oct. 1951. (MAB 3.8-136)
- Farley, F. J. M., The theory of condensation of supersaturated ion-free vapour. *Royal Society of London, Proceedings, Ser. A*, 212:530-542, 1952. (MAB 4.1-190)
- Farley, F. J. M., Clouds produced in an expansion chamber by ultra-violet light. *Royal Society of London, Proceedings, Ser. A*, 207 (1091):527-539, July 23, 1951.
- Gold, L. W. and Power, B. A., Correlation of snow-crystal type with estimated temperature of formation. *Journal of Meteorology*, 9 (6):447, Dec. 1952. (MAB 4.7-160)
- Gunn, Kenrick and Hitschfeld, Walter, A laboratory investigation of the coalescence between large and small water-drops. *Journal of Meteorology*, 8 (1):7-16, Feb. 1951. (MAB 2.8-115)
- Hacker, Paul T., Experimental values of the surface tension of supercooled water. *U. S. N.A.C.A., Technical Note*, 2510, Oct. 1951.
- Hammer, C., Untersuchungen über Kristallkeime. [Investigation on crystal nuclei.] *Annalen der Physik*, Ser. 5, 33 (5):445-458, Nov. 1938.
- Hitschfeld, Walter, Free fall of drops through air. *American Geophysical Union, Transactions*, 32 (5):697-700, Oct. 1951. (MAB 3.5-244)
- Hosler, C. L., On the crystallization of supercooled clouds. *Journal of Meteorology*, 8 (5):331, Oct. 1951. (MAB 3.4-187)
- Humbel, F.; Jona, F. and Scherrer, P., Anisotropie der Dielektrizitäts-Konstante des Eises. [Anisotropy of the dielectric constant of ice.] *Helvetica Physica Acta*, 26:17-32, 1953.
- Inn, Edward C. Y., Photolytic inactivation of ice-forming silver iodide nuclei. *American Meteorological Society, Bulletin*, 32 (4):132-136, April 1951. (MAB 3.8-137)
- Ito, Kyôji, Phenomena of ice crystals in the air. *Papers in Meteorology and Geophysics*, 2 (1):75, March 1951. (MAB 3.11-208)
- Ito, Kyôji, On the growth of ice crystals in the air. *Papers in Meteorology and Geophysics*, 2 (3-4):315-316, Dec. 1951. (MAB 4.6-163)
- Ito, Kyôji, Forms of ice crystals in the air.—Size, mass and some other properties of ice crystals in the air. (On small ice crystals, Pts. 2 and 3.) *Papers in Meteorology and Geophysics*, Tokyo, 3 (3, 4):207-216, 297-306, Jan., March 1953. (MAB 5.5-181)

- Jona, F. and Scherrer, P., **Die elastischen Konstanten von Eiskristallen.** [The elastic constants of ice crystals.] *Helvetica Physica Acta*, 25:35-54, 1952.
- Kinzer, Gilbert D. and Gunn, Ross, **The evaporation, temperature and thermal relaxation-time of freely falling waterdrops.** *Journal of Meteorology*, 8(2):71-83, April 1951. (MAB 2.10-125)
- Lenard, P. and Ramsauer, C., **Über die Wirkungen ultravioletten Lichtes auf Gase unter besonderer Berücksichtigung der Vorgänge in der Erdatmosphäre.** [Effects of ultraviolet light on gases with special reference to atmospheric processes.] *Meteorologische Zeitschrift*, 29(4):150-157, 1912.
- McDonald, James E., **Theoretical cloud physics studies.** Iowa State College. Physics Dept., Contract Nonr-757, T. O. (00), Final Report, Jan. 31, 1953. (MAB 4.11-3)
- McDonald, James E., **Erroneous cloud-physics applications of Raoult's law.** *Journal of Meteorology*, 10(1):68-70, Feb. 1953. (MAB 4.8-168)
- Magono, Chōjo, **On the fall velocity of snowflakes.** *Journal of Meteorology*, 8(3):199-200, June 1951. (MAB 3.4-207)
- Magono, Chōjo, **On the growth of snow flake and graupel.** *Yokohama National Univ., Science Reports*, I, p. 18-40, 1953.
- Mason, B. J., **The spontaneous crystallisation of supercooled water.** *Royal Meteorological Society, Quarterly Journal*, 78(335):22-27, Jan. 1952. (MAB 3.4-188)
- Mason, B. J., **Spontaneous condensation of water vapor in expansion chamber experiments.** *Physical Society, Proceedings, Sec. B*, 64:773-779, 1951.
- Mason, Basil John, **The growth of ice crystals in a supercooled water cloud.** *Royal Meteorological Society, Quarterly Journal*, 79(339):104-111, Jan. 1953. (MAB 4.6-164)
- Mason, B. J. and Owston, P. G., **Ice crystals of spiral form grown from the vapor.** *Philosophical Magazine*, 7th Ser., 43(343):911-912, Aug. 1952. (MAB 5.1-220)
- Melcher, Domenic, **Experimentelle Untersuchung von Vereisungserscheinungen.** [Experimental investigation of icing phenomena.] *Zeitschrift für angewandte Mathematik und Physik*, 2(6):421-443, 1951. (MAB 3.5-236)
- Pound, G. M.; Madonna, L. A. and Peake, S. L., **Critical supercooling of pure water droplets by a new microscopic technique.** Carnegie Institute of Technology. Metals Research Lab., Scientific Report, No. 1, Dec. 1, 1952. (MAB 5.5-160)
- Ramsauer, C. and Lenard, P., **Über die Nebelkernbildung durch Licht in der Erdatmosphäre und in anderen Gasen und über Ozonbildung.** [Formation of fog nuclei by light in the earth's atmosphere and other gases, and ozone formation.] *Akademie der Wissenschaften, Heidelberg, Math.-Naturw. Klasse, Sitzungsberichte; Abhandlung* 16, 1911. 27 p.
- Rau, Walter, **Eiskeimbildung durch dielektrische Polarisierung.** [Formation of ice nuclei by dielectric polarization.] *Zeitschrift für Naturforschung*, 6a:649-657, 1951.
- Rau, Walter, **Über den Einfluss des Tropfenvolumens auf die Unterkühlbarkeit von Wassertropfen und die Bedeutung des Gefrierkernspektrums.** [On the influence of drop volume on the supercooling of water drops and the importance of the freezing nuclei spectrum.] *Zeitschrift für Naturforschung*, 8a(2/3):197-204, Feb./March 1953. (MAB 4.8-172)
- Reynolds, S. E., **Ice-crystal growth.** *Journal of Meteorology*, 9(1):36-40, Feb. 1952. (MAB 3.9-181)
- Reynolds, S. E.; Hume, William, II; Vonnegut, Bernard and Schaefer, Vincent J., **Effect of sunlight on the action of silver iodide particles as sublimation nuclei.** *American Meteorological Society, Bulletin*, 32(2):47, Feb. 1951. (MAB 2.9-120)
- Reynolds, S. E.; Hume, William, II and McWhirter, Max, **Effects of sunlight and ammonia on the action of silver-iodide particles as sublimation nuclei.** *American Meteorological Society, Bulletin*, 33(1):26-31, Jan. 1952. (MAB 4.3-193)
- Schumann, T. E. W., **Theoretical aspects of the size distribution of fog particles.** *Royal Meteorological Society, Quarterly Journal*, 66(285):195-207, April 1940.
- Soulage, G., **Sur les cristaux de glace obtenus par l'action de l'iodure d'argent sur les stratus surfondus.** [Ice crystals produced by silver iodide in supercooled stratus.] *Puy de Dôme Observatory, Bulletin*, 2:41-50, 1953.
- Squires, P., **The growth of cloud drops by condensation.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 5(1):59-86, March 1952. (MAB 4.2-187)
- Swinne, Richard, **Zur Kristallisierung unterkühlter dielektrischer Flüssigkeiten in einem elektrischen Felde.** [Crystallization of supercooled dielectric liquids in an electrical field.] *Wissenschaftliche Veröffentlichungen aus den Siemens-Werken*, 15(2):124-128, 1936.
- Vierhout, R. R., **On the formation of rain clouds not reaching up to the freezing level.** *Journal of Meteorology*, 7(3):223-226, June 1950.
- Vierhout, R. R., **On the formation of drops in clouds and fog.** *K.N.M.I., Mededeelingen en Verhandelingen, Ser. B, Deel II*, No. 12, No. 125, 1949. 20 p.

- Vonnegut, Bernard and Neubauer, Raymond, **Recent experiments on the effect of ultraviolet light on silver iodide nuclei.** *American Meteorological Society, Bulletin*, 32(9):356, Nov. 1951.
- Weickmann, Helmut K., "Biologie" der Schneekristalle. ["Biology" of snow crystals] *Umschau*, 50(4):116-119, Feb. 1950. (MAB 3.8-139)
- Weickmann, Helmut K., **A theory of the formation of ice crystals.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 4:309-323, 1951. (MAB 3.3-174)
- Wyle, R. G., **The freezing of supercooled water in glass.** *Physical Society, Proceedings, Ser. 66*:241-254, 1953.
- Yamamoto, Gi-ichi; Ogiwara, Sekiji; Yoshida, Kanji and others, **Observations of the growth of ice crystals artificially produced in the atmosphere.** *Tohoku Univ., Scientific Reports, 5th Ser., Geophysics*, 4(2):83-87, Oct. 1952. (MAB 4.9-192)
- Zaitsev, V. A., **Vodnost' i raspredelenie kapel' v kuchevykh oblakakh.** [Water content and distribution of drops in cumulus clouds.] *Leningrad. Glavnaia Geofizicheskaya Observatoriia, Trudy*, 19(81):122-132, 1950. (MAB 2.8-107)

D. PAPERS ON FORMATION AND PROPERTIES OF CLOUDS

- Appleman, H., **The formation of exhaust condensation trails by jet craft.** *American Meteorological Society, Bulletin*, 34(1):14-20, Jan. 1953. (MAB 5.1-227)
- aufm Kampe, Hans Joachim and Weickmann, Helmut K., **Trabert's formula and the determination of the water content in clouds.** *Journal of Meteorology*, 9(3):167-171, June 1952. (MAB 3I-277)
- Baumgartner, A., **Beobachtungen an Kondensfahnen hinter Flugzeugen mit Strahltriebwerken.** [Observations on condensation trails behind aircraft with jet engines.] *Germanischer Wetterdienst in der US-Zone, Berichte*, No. 38:295-298, 1952. (MAB 4.3-194)
- Bryson, Reid A., **A cloudform-stability scale for tropical oceanic areas.** *American Meteorological Society, Bulletin*, 32(4):146-150, April 1951. (MAB 3.10-220)
- Byers, Horace R., **An example of a flight through a thunderstorm updraft.** *American Meteorological Society, Bulletin*, 33(5):211-212, May 1952. (MAB 4.4-123)
- Colson, DeVer, **Results of double-theodolite observations at Bishop, Calif., in connection with the "Bishop-Wave" phenomena.** *American Meteorological Society, Bulletin*, 33(3):107-111, March 1952. (MAB 4.3-166)
- Durst, C. S., **High level cloud in the tropics.** *Meteorological Magazine, London*, 82:79-81, 1953. (MAB 3.11-189)
- Farquharson, James Strachan, **Cloud in the stratosphere.** *Meteorological Magazine, London*, 81(965):341-345, Nov. 1952. (MAB 4.4-194)
- Fletcher, R. D. and Sartor, Doyne, **Cirrus.** *Weatherwise*, 5(1):8-9, Feb. 1952. (MAB 3.10-220)
- Foster, Hal, **A radar observation of Bénard cells.** *Journal of Meteorology*, 9(6):437-439, June 1952. (MAB 4.6-169)
- Holzman, B. G., **Meteorological aspects of the atomic "Base Surge."** *American Meteorological Society, Bulletin*, 32(7):251-258, Sept. 1951. (MAB 3.5-91)
- Houghton, Henry G. and Cramer, Harrison E., **A theory of entrainment in convective currents.** *Journal of Meteorology*, 8(2):95-102, April 1951. (MAB 3.1-125)
- Hurst, G. W., **Cloud photographs taken from Comet aircraft.** *Meteorological Magazine, London*, 81(960):173-174, June 1952. (MAB 4.1-172)
- Jenkins, C. F., **Flying the mountain wave.** *Flying Safety*, 8:2-6, 1952.
- Jones, R. F., **Radar evidence of the formation of Bénard convection cells.** *Meteorological Magazine, London*, 81(959):152-153, May 1952. (MAB 3.9-93)
- Langwell, Patricia A., **A mechanism for convection over the ocean.** *Journal of Meteorology*, 10(3):187-190, June 1953. (MAB 4.11-213)
- Langwell, Patricia A., **Forced convection cell circulation in clear air.** *American Geophysical Union, Transactions*, 32(1):7-14, Feb. 1951. (MAB 2.9-117)
- Ludlam, Frank Henry, **Hill-wave cirrus.** *Weather*, 7(10):300-306, Oct. 1952. (MAB 4.2-194)
- Ludlam, Frank Henry, **Orographic cirrus clouds.** *Royal Meteorological Society, Quarterly Journal*, 78(338):554-562, Oct. 1952. (MAB 4.2-196)
- Malkus, Joanne S.; Scorer, R. S. and Ludlam, F. H., **Bubble theory of penetrative convection.** *Royal Meteorological Society, Quarterly Journal*, 79(340):288-292, April 1953. (MAB 4.8-158)
- Malkus, Joanne Starr, **Recent advances in the study of convective clouds and their interaction with environment.** *Woods Hole Oceanographic Institution, Technical Report No.*, Sept. 1951. (MAB 3.10-222)
- Malkus, Joanne Starr, **The slopes of cumulus clouds in relation to external wind shear.** *Royal Meteorological Society, Quarterly Journal*, 78(338):530-542, Oct. 1952. (MAB 4.2-197)

- Molchanov, P., Die Höhe der Wolken im Zusammenhang mit den Feuchtigkeitsverhältnissen an der Erdoberfläche. [The height of clouds in connection with humidity condition at the earth's surface.] *Meteorologische Zeitschrift*, 41:286-288, 1924.
- Nurminen, Aili, Wind convergence as a factor in persistent radiation fog. *American Meteorological Society, Bulletin*, 32(2):72-73, Feb. 1951. (MAB 2.11-137)
- Pielstieker, U., Über den Aufbau thermischer Aufwindgebiete. [The structure of thermal updraft areas.] *Beiträge zur Physik der freien Atmosphäre*, 27:1-22, 1940.
- Sawyer, J. S. and Ilett, B., The distribution of medium and high cloud near the jet streams. *Meteorological Magazine*, London, 80(952):277-281, Oct. 1951. (MAB 3.4-195)
- Schaefer, Vincent J., Cloud forms of the jet stream. *Tellus*, 5(1):27-31, Feb. 1953. (MAB 4G-128)
- Scorer, R. S. and Ludlam, Frank Henry, Bubble theory of penetrative convection. *Royal Meteorological Society, Quarterly Journal*, 79(339):94-103, Jan. 1953. (MAB 4.6-156)
- Scorer, R. S., Mammatus. *Meteorological Magazine*, London, 82(968):57, Feb. 1953. (MAB 4.10-197)
- Squires, P. and Gillespie, C. A., A cloud-droplet sampler for use on aircraft. *Royal Meteorological Society, Quarterly Journal*, 78(337):387-393, July 1952. (MAB 3.11-65)
- Stommel, Henry, Entrainment of air into a cumulus cloud II. *Journal of Meteorology*, 8(2):127-129, April 1951. (MAB 2.11-140)
- Wehner, Hans, Ein Beitrag zum Problem der hohen Perlmutterwolken. [A contribution to the problem of high mother-of-pearl clouds.] *Meteorologische Rundschau*, 4(9-10):180-181, Sept.-Oct. 1951. (MAB 3.8-218)
- Weickmann, H. K. and aufm Kampe, H. J., Physical properties of cumulus clouds. *Journal of Meteorology*, 10(3):204-211, June 1953. (MAB 4.11-206)

PAPERS ON NATURAL PRECIPITATION

- Battan, Louis J., Observations on the formation and spread of precipitation in convective clouds. *Journal of Meteorology*, 10(5):311-324, Oct. 1953. (MAB 5.3-257)
- Bergeron, Tor, Über den Mechanismus der ergiebigen Niederschläge. [On the mechanism of heavy rainfall.] *Germany. Deutscher Wetterdienst in der U.S.-Zone, Berichte*, No. 12:225-232, 1950.
- Bowen, E. G., The formation of rain by coalescence. *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 3(2):193-213, June 1950. (MAB 2.8-114)
- Cunningham, Robert M., Some observations of natural precipitation processes. *American Meteorological Society, Bulletin*, 32(9):334-343, Nov. 1951. (MAB 4.4-201)
- Cunningham, Robert M., Distribution and growth of hydrometeors around a deep cyclone. Massachusetts Institute of Technology. Dept. of Meteorology. Technical Report, No. 18, May 9, 1952. 59 p. (MAB 5.4-171)
- Goldman, Louis, On forecasting ceiling lowering during continuous rain. *Monthly Weather Review*, 79(7):133-142, July 1951. (MAB 3E-202)
- Harlin, Ben W., The great southern glaze storm of 1951. *Weatherwise*, 5(1):10-13, Feb. 1952. (MAB 3.9-185)
- Houghton, Henry G., A preliminary quantitative analysis of precipitation mechanisms. *Journal of Meteorology*, 7(6):363-369, Dec. 1950. (MAB 2.5-141)
- Johnson, Ernest and Mook, Conrad P., The heavy snowstorm of January 28-30, 1953 at the eastern end of Lake Ontario. *Monthly Weather Review*, 81(1):26-30, Jan. 1953. (MAB 5.2-220)
- Ludlam, F. H., The production of showers by the coalescence of cloud droplets. *Royal Meteorological Society, Quarterly Journal*, 77(333):402-417, July 1951. (MAB 2.10-128)
- Ludlam, F. H., Structure of shower clouds. *Nature*, London, 167(4242):254-256, Feb. 17, 1951. (MAB 2.6-94)
- Ludlam, Frank Henry, Artificial and natural shower formation. *Weather*, 7(7):199-204, July 1952. (MAB 3.11-89)
- Ludlam, Frank Henry, The production of showers by the growth of ice particles. *Royal Meteorological Society, Quarterly Journal*, 78(338):543-553, Oct. 1952. (MAB 4.2-199)
- Mason, B. J., Production of rain and drizzle by coalescence in stratiform clouds. *Royal Meteorological Society, Quarterly Journal*, 78(337):377-386, July 1952. (MAB 3.11-180)
- Mason, B. J. and Howorth, B. P., Some characteristics of stratiform clouds over North Ireland in relation to their precipitation. *Royal Meteorological Society, Quarterly Journal*, 78(336):226-230, April 1952. (MAB 3.7-156)
- Meinke, Wayne W., Observations on radioactive snows at Ann Arbor, Michigan. *Science*, 113(2941):545-546, May 11, 1951.

- Schwerdtfeger, Werner, Gedanken über ein Ausgleichs-Prinzip des atmosphärischen Ges. Niederschlages. [Idea on a equalization principle for total atmospheric precipitation.] *Meteorologische Rundschau*, 4(5-6):96-97, May-June 1951. (MAB 2.11-145)
- Smith, E. J., Observations of rain from non-freezing clouds. *Royal Meteorological Society Quarterly Journal*, 77(331):33-43, Jan. 1951. (MAB 2.5-129)
- Styles, R. S. and Campbell, F. W., Radar observations of rain from non-freezing clouds. *Australian Journal of Physics*, 6(1):73-85, March 1953. (MAB 5.4-196)
- Ward, R., Rain from non-freezing cloud. *Meteorological Magazine*, London, 81(956):56-60, Feb. 1952. (MAB 3.6-146)

F. PAPERS ON ARTIFICIAL PRECIPITATION AND CLOUD MODIFICATION

- Alby, E., Phénomènes optiques apparaissant dans les stratus surfondus traités par l'iodure d'argent. [Optical phenomena in supercooled stratus treated with silver iodide.] *Bulletin de Dôme Observatory*, 2:51-54, 1953.
- Byers, Horace R., Rational approach to rain making. *Indian Academy of Sciences, Bangalore Proceedings, Sec. A*, 37(2):237-247, 1953. (MAB 5.3-243)
- Dessens, H., Action de l'iodure d'argent sur les stratus surfondus. [Effect of silver iodide upon supercooled stratus.] *Puy de Dôme Observatory, Bulletin*, 2:33-40, 1953.
- Dufour, Louis, Peut-on faire pleuvoir artificiellement? [Can rain be made artificially?] *Ciel et Terre*, 68(9/10):187-195, Sept./Oct. 1952. (MAB 4.10-84)
- Hall, William Ferguson, An evaluation of the technique of cloud seeding to date. *New York Academy of Sciences, Transactions, Ser. II*, 14:45, 1952. (MAB 3.8-67)
- Hall, W. Ferguson, Status of possibilities of artificial precipitation. *American Geophysical Union, Transactions*, 33(6):866-870, Dec. 1952. (MAB 4.9-56)
- Hall, W. F., Tentative plans for Weather Bureau Artificial Cloud Nucleation Project. 18 p.
- Hawkins, H. F., Jr., The weather and circulation of May 1952; including a study of some periodicities. *Monthly Weather Review*, 80(5):82-87, May 1952.
- Holzman, Benjamin, The effect of atomic bomb explosions on weather. *Weatherwise*, 4(1):1-10, Feb. 1951. (MAB 2.11-6)
- Holzman, B. G., Seven-day periods. *American Meteorological Society, Bulletin*, 32(3):1-10, March 1951.
- Krick, Irving P. and Smith, T. B., Some evaluations of sustained cloud-seeding operations. *American Geophysical Union, Transactions*, 33(1):53056, Feb. 1952. (MAB 4.1-71) Discussion by John Summersett and T. B. Smith, *ibid.*, 34:137-140, Feb. 1953.
- Langmuir, Irving, Analysis of the effects of periodic seeding of the atmosphere with silver iodide. General Electric Research Laboratory, Project Cirrus, Final Report, Pt. 1, May 1953. 340 p.
- Lewis, William, On a seven-day periodicity. *American Meteorological Society, Bulletin*, 32(1):1-10, May 1951. (MAB 3.4-157)
- Schaefer, Vincent J., Laboratory, field and flight experiments. General Electric Research Laboratory, Project Cirrus, Final Report, Pt. 1, March 1953.
- Shellard, H. C. and Grant, D. R., Results of an artificial nucleation experiment. *Meteorological Magazine*, London, 80(951):253-255, Sept. 1951. (MAB 3.3-72)
- Smith, E. J., The influence of meteorological conditions on rain-making in the Sydney region. *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 5(1):87-103, 1952. (MAB 4.2-76)
- Wahl, Eberhard, On a seven-day periodicity in weather in the United States during April 1951. *American Meteorological Society, Bulletin*, 32(5):193, May 1951. (MAB 3.5-196)
- Weickmann, Helmut K., Das Problem der künstlichen Vermehrung von Aufgleitniederschlag. [The problem of artificially increasing warmfront rainfall.] *Germany, Deutscher Wetterdienst in der US-Zone, Berichte*, No. 38:401-407, Weickmann-Heft, 1952. (MAB 4.2-100)

G. PAPERS ON THUNDERSTORMS, HAILSTORMS, TORNADOES, AND THUNDERSTORM ELECTRICITY

- Barnard, V., The approximate mean height of the thundercloud charges taking part in lightning to ground. *Journal of Geophysical Research*, 56(1):33-35, March 1951. (MAB 3.8-100)
- Berry, A. W., Speed of development and localization of thunder clouds. *Meteorological Magazine*, London, 81(962):247-248, Aug. 1952.
- Bleeker, Wouter and Delver, A., Some new ideas on the formation of windspouts and tornadoes. *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 4:220-237, 1951. (MAB 3.3-124)

- Braham, Roscoe R., Jr., **The water and energy budgets of the thunderstorm and their relation to thunderstorm development.** *Journal of Meteorology*, 9(4):227-242, Aug. 1952. (MAB 4.4-120)
- Brooks, Edward M., **A remarkable December hailstorm.** *Weatherwise*, 4(3):58-59, June 1951. (MAB 3.1-141)
- Brooks, Edward M., **The tornado cyclone.** *Weatherwise*, 2:32-33, 1949.
- Byers, Horace R., **Non-frontal thunderstorms.** *Chicago Univ., Institute of Meteorology, Miscellaneous Reports*, No. 3, 1942. 26 p.
- Chalmers, J. Alan, **Electric charges from ice friction.** *Journal of Atmospheric and Terrestrial Physics*, 2(6):337-339, 1952. (MAB 4.5-231)
- El-Fandy, M. G., **Forecasting thunderstorms in the Red Sea.** *American Meteorological Society, Bulletin*, 33(8):332-338, Oct. 1952. (MAB 4.7-50)
- Faust, Heinrich, **Kaltfronten und Gewitter.** A. Über Kaltfronten und ihre Einteilung. B. Über Entstehung und Energiequelle der Gewitterböen. C. Statistische Untersuchungen an Gewittern im frontfreien Raum. [Cold fronts and thunderstorms. A. Cold fronts and their classification. B. The origin and sources of energy of thundersqualls. C. Statistical investigations on air mass thunderstorms.] *Germany, Deutscher Wetterdienst in der US-Zone, Berichte*, No. 24, 1951. 55 p. (MAB 4.5-4)
- Fawbush, E. J. and Miller, R. C., **Air Weather Service Manual 105-37.** Severe Weather Forecasting Headquarters, Air Weather Service, Washington, D. C., 1952.
- Fawbush, E. J. and Miller, R. C., **A mean sounding representative of the tornadic airmass environment.** *American Meteorological Society, Bulletin*, 33(7):303-307, Sept. 1952.
- Fawbush, E. J.; Miller, R. C. and Starrett, L. G., **An empirical method of forecasting tornado development.** *American Meteorological Society, Bulletin*, 32(1):1-9, Jan. 1951. (MAB 2.9-41)
- Fawbush, Ernest J. and Miller, Robert C., **A method for forecasting hailstone size at the earth's surface.** *American Meteorological Society, Bulletin*, 34(6):235-244, June 1953.
- Fawbush, Ernest J. and Miller, Robert C., **The tornado situation of 17 March 1951.** *American Meteorological Society, Bulletin*, 34(4):139-145, April 1953. (MAB 5.5-67)
- Feteris, P. J., **Detailed observations of thunderstorms.** *Weather*, 7(2):35-39, Feb. 1952. (MAB 3.7-111)
- Gill, E. W. B. and Alfrey, G. F., **Production of electric charges on water drops.** *Nature*, London, 169(4292):203-204, Feb. 2, 1952. (MAB 3.8-227)
- Gill, E. W. B. and Alfrey, G. F., **The electrification of liquid drops.** *Physical Society of London, Proceedings, Ser. B*, 65(394):546-551, 1952. (MAB 4.5-226)
- Gold, Ernest, **Thunderbolts: the electric phenomena of thunderstorms.** *Nature*, London, 169(4301):561-563, April 5, 1952. (MAB 3.8-220)
- Hall, Roy S., **Inside a Texas tornado.** *Weatherwise*, 4(3):54-57, 65, June 1951. (MAB 3.1-100)
- Harrison, Henry T. and Beckwith, W. B., **Studies on the distribution and forecasting of hail in Western United States.** *American Meteorological Society, Bulletin*, 32(4):119-131, April 1951. (MAB 2.11-151)
- Koschmieder, Harald, **Zur Trombenbildung.** [On tornado formation.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 4:203-219, 1951. (MAB 3.3-126)
- Kumm, A., **Über die Entstehung von elektrischen Ladungen bei Vorgängen in der kristallinen Eisphase.** [On the origin of electric charges by processes in the crystalline ice phase.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 3(5):382-401, 1951. (MAB 3.2-195)
- Kunkel, W. B., **The static electrification of dust particles on dispersion into a cloud.** *Journal of Applied Physics*, 21:820-832, 1950.
- Lueder, Holger, **Ein neuer elektrischer Effekt bei der Eisbildung durch Vergraupelung in natürlichen unterkühlten Nebeln.** [A new electrical effect connected with graupel-type ice formation in natural supercooled fogs.] *Zeitschrift für angewandte Physik*, 3(7):247-253, July 1951.
- Lueder, Holger, **Vergraupelungselektrisierung als eine Ursache der Gewitterelektrizität.** [The formation of graupel as a cause of thunderstorm electricity.] *Zeitschrift für angewandte Physik*, 3(8):288-295, Aug. 1951.
- Malan, D. J. and Schonland, B. F. J., **The distribution of electricity in thunderclouds.** *Royal Society of London, Proceedings, Ser. A*, 209:158-177, 1951. (MAB 3.5-281)
- Malan, D. J. and Schonland, B. F. J., **The electrical processes in the intervals between the strokes of a lightning discharge.** *Royal Society of London, Proceedings, Ser. A*, 206:145-163, 1951. (MAB 3.4-252)
- Malan, D. J. and Schonland, B. F. J., **The electrical processes in the intervals between the strokes of a lightning discharge.** *Royal Society of London, Proceedings, Ser. A*, 206:145-163, 1951. (MAB 3.4-252)

- Meinhold, Heinz, Die elektrische Ladung eines Flugzeuges bei Vereisung in Quellwolken. [The electrical charge on an airplane during icing in cumulus clouds.] *Geophysica Applicata*, 19(3/4):176-178, 1951. (MAB 3.1-178)
- Mull, S. and Rao, Y. P., Dynamics of thunderstorms, Pt. II.—Origin of downdrafts in a thunderstorm and the circulation in a full-fledged thunderstorm cell. *Indian Journal of Meteorology and Geophysics*, 1(4):291-297, Oct. 1950. (MAB 2.3-78)
- Neumann, J., Land breezes and nocturnal thunderstorms. *Journal of Meteorology*, 8(1):60-61, Feb. 1951. (MAB 2E-240)
- Rajeswara, Rao N., A severe hailstorm at Hyderabad on 26 March 1951. *Indian Journal of Meteorology and Geophysics*, 3(1):69, Jan. 1952. (MAB 4.8-205)
- Ray Choudhuri, S. N., On thermodynamics of downdrafts. *Indian Journal of Meteorology and Geophysics*, 3(1):49-52, Jan. 1952. (MAB 4.8-93)
- Reynolds, S. E., Thunderstorm-precipitation growth and electrical-charge generation. *American Meteorological Society, Bulletin*, 34(3):117-123, March 1953. (MAB 5.2-192)
- Schaffer, W., Second note on the thunderstorm high. *American Meteorological Society, Bulletin*, 33(4):150-152, April 1952. (MAB 4.1-111)
- Schonland, B. F. J. and Malan, D. J., The distribution of electricity in thunderclouds. *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 3(1/2):64-69, 1950. (MAB 2.2-164)
- Souter, Robert K. and Emerson, Joseph B., Summary of available hail literature and the effect of hail on aircraft in flight. *U. S. NACA, Technical Note*, 2734, Sept. 1952. (MAB 4.1-12)
- Stimmel, Donald G.; Rogers, Emery H.; Waterfall, Franklin E. and Gunn, Ross, Electrification of aircraft flying in precipitation areas. *Institute of Radio Engineers, Proceedings*, 34(1):167-177, April 1946.
- Stout, G. E. and Huff, F. A., Radar records Illinois tornadogenesis. *American Meteorological Society, Bulletin*, 34(6):281-284, June 1953.
- Tepper, Morris, The Tornado and Severe Storm Project. *Weatherwise*, 4(3):51-53, June 1951. (MAB 3.3-123)
- Thunderstorm electrification. *Meteorological Magazine*, London, 80(943):15-18, Jan. 1951. (MAB 2.6-151)
- Weickmann, Helmut, K. Observational data on the formation of precipitation in cumulonimbus clouds. (In: *Thunderstorm Electricity*. Chicago, Univ. of Chicago Press, 1953. p. 138.)
- Wormell, Thomas Wilson, Reviews of modern meteorology—8. Atmospheric electricity; recent trends and problems. *Royal Meteorological Society, Quarterly Journal*, 79(3):3-38, Jan. 1953. (MAB 4.7-217)

H. PAPERS ON RADAR AND CLOUD PHYSICS RESEARCH

- Atlas, D. and Paulsen, W. H., Note on precipitation trajectories and radar patterns. McGill Univ. Third Radar Weather Conference, Proceedings, p. A45-A48, 1952.
- Battan, L. J., Formation of precipitation in natural clouds as indicated by radar. McGill Univ. Third Radar Weather Conference, Proceedings, p. A9-A16, 1952.
- Bowen, E. G., Radar observations of rain and their relation to mechanisms of rain formation. *Journal of Atmospheric and Terrestrial Physics*, 1(3):125-140, 1951. (MAB 2.11-142)
- Browne, Ian C., Precipitation streaks as a cause of radar upper bands. *Royal Meteorological Society, Quarterly Journal*, 78(338):590-595, Oct. 1952.
- Browne, Ian C. and Wexler, R., The collection efficiency of ice crystals. *Royal Meteorological Society, Quarterly Journal*, 79(342):549, Oct. 1953. (MAB 5.3-241)
- Jones, R. F., Turbulence in relation to the radar echoes from cumulonimbus clouds. McGill Univ., Third Radar Weather Conference, Proceedings, p. A37-A44, 1952.
- Marshall, John Stewart and Gunn, K. L. S., Measurements of snow parameters by radar. *Journal of Meteorology*, 9(5):322-327, Oct. 1952. (MAB 4.2-35)
- Plank, V. G.; Atlas, D. and Paulsen, W. H., Preliminary survey of cloud and precipitation detection at 1.25 cm. McGill Univ. Third Radar Weather Conference, Proceedings, p. B13-V20A, 1952.
- Reynolds, S. E. and Braham, Roscoe, Significance of the initial radar echo. *American Meteorological Society, Bulletin*, 33(3):123, March 1952. (MAB 4.9-33)
- Wexler, R., Radar echo from a growing thunderstorm. McGill Univ. Third Radar Weather Conference, Proceedings, p. A1-A8, 1952.
- Wexler, R., Theory of the radar upper band. *Royal Meteorological Society, Quarterly Journal*, 78(337):372-376, July 1952. (MAB 3.10-36)

RT III (b). METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only, and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of date of publication, the pagination may be omitted.

physical Magazine, Tokyo, Volume 25, Number 3-4, March 1954.

- Wadati K. and Inouye, W.: On the T-phase of seismic waves observed in Japan, p. 159-165.
 Wadati K. and Iwai Y.: The minute investigation of seismicity in Japan, p. 167-173.
 Inouye, W.; Hirono, T. and Murai, G.: Microseisms and surf, p. 175-183.
 Ichiye, T.: On the variation of oceanic circulation (VI) (Preliminary report on the cold waters in the Kuroshio region), p. 185-217.
 Suzuki, S.: The nocturnal cooling of plant leaves and hoarfrost thereon, p. 219-235.
 Kitagawa, N.; Iizuka, T., Murai, K. and Kobayashi, M.: On some aspects of lightning discharge observed by electrostatic fluxmeter, p. 237-242.
 Usami, T.: Tables of integral of product of three Legendre functions, p. 243-245.

ia. Meteorological Department, Memoirs, Vol. 29.

- No. 1 Mull, S.; Desai, B. N. and Sircar, S. P., Investigation into the variation of the lapse rate of temperature in the atmosphere near the ground at Drigh Road, Karachi, pub. 1942.
 No. 2 Ananthakrishnan, R., Discussion of upper air data obtained from aeroplane meteorological flights over Peshawar and Quetta during the years 1927-1937, pub. 1942.
 No. 3 George, P. A., Squalliness of monsoon showers at Juhu, Bombay, pub. 1952.
 No. 4 Pramanik, S. K. and Rao, K. N., Hydrometeorology of Koyna Catchment, pub. 1952.
 No. 5 Rao, K. N., Equivalent and equivalent potential temperatures, pub. 1953.
 No. 6 Pramanik, S. K. and Rao, K. N., Hydrometeorology of Damodar Catchment, pub. 1953.

International Council of Scientific Unions. Mixed Commission on the Ionosphere, Third Meeting, Canberra, Australia, Aug. 24-26, 1952, Proceedings, Publ. Brussels, 1953.

- Baker, W. G. and Martyn, D. F.: Conductivity of the ionosphere, p. 9-19.
 Massey, H. S. W.: Recent laboratory measurements of recombination coefficients and the problem of ionospheric recombination coefficients and the problem of ionospheric recombination, p. 20-32.
 Estrabaud, S.: Mesures ionosphériques effectuées à Bangui lors de l'éclipse solaire du 25 février 1952, [Ionospheric measurements at Bangui during the solar eclipse, Feb. 25, 1952], p. 34-38.
 Minnis, C. M.: Ionospheric measurements at Khartoum during the total eclipse on 25 Feb. 1952, p. 38-42.
 Piggott, W. R.: Ionospheric measurements at Ibadan, Nigeria during the eclipse of the sun, Feb. 25, 1952, p. 42-50.
 Perers, Olof F.: Ionospheric observations made by the Swedish Solar Eclipse Expedition to Italy on Feb. 25, 1952, p. 50-62.
 Appleton, Sir Edward: Region F2 anomalies, p. 63-70.
 Lepechinsky, D.: Effects of temperature variations on the formation of ionospheric layers, p. 71-73.
 Martyn, D. F.: Region F2 in a magnetic storm, p. 73-83.
 Chapman, Sydney: Morphology of magnetic storms, p. 84-94.
 Chapman, Sydney: International Geophysical Year, 1957-1958, p. 94-99.
 Commission Resolutions, p. 100-104.
 Cowling, T. G.: Electrical conductivity of the ionosphere, p. 106-109.
 Maeda, Ken-Ichi: Conductivity of the ionosphere, p. 110-122.
 Hasegawa, H. and Maeda, H.: Note on the electrical conductivity of the ionosphere, p. 123-134.
 Vegard, Lars: Doppler displacement of the ionospheric hydrogen lines and its bearing on the auroral theory and solar terrestrial relationships, p. 135-144.
 Rawer, Karl: Note on anomalies of region F2 and on ionospheric storms, p. 145-153.
 Möller, Hans Georg: Beobachtung der 3. Komponente in mittleren Breiten, [Observations of the third component of middle latitude], p. 153-159.
 Scott, James C. W.: Distribution of F2 region ionization at high latitudes, p. 159-167.
 Aono, Y.: Regional anomalies in foF2 of the ionosphere, p. 167-173.
 Uyeda, Hiroyuki: Studies on ionospheric storms, p. 173-186.

Becker, Walter: Typische Streuprozesse radiofrequenter Strahlung an Elektronenwolken und sporadischen Es-Schicht dargestellt an Hand ausgewählter Durchdrehaufnahmen, [Typical processes of scattering of radio frequency radiation on electron clouds of the sporadic E layer, depicted by selected sweep recorder photographs], p. 186-193.

International Geographical Congress, 17th, Washington, August 8-15, 1952, Proceedings (1952?).

- Aario, Leo: Climatic changes and cultural geographic development, p. 21-24.
 Flohn, Hermann: Trade-wind and monsoon circulation according to aerological observations, p. 24-27.
 Fukui, Eiichiro: Climatic disasters of Japan, p. 28-30.
 Lackey, Earl: Some temperature probabilities inherent in weather records, p. 30-32.
 Miller, A. Austin: The importance of 43°F (6°C) in the classification of temperature climates and in the definition of major geographical regions, p. 32-36.
 Pugh, J. C.: Rainfall reliability in Nigeria, p. 36-41.
 Sekiguti, Takeshi: Some problems of climatic classification: a new classification of climates of Japan, p. 41-46.
 Thornthwaite, C. W.: Climate in relation to planting and irrigation of vegetable crops, p. 46-48.

Israel Meteorological Service, Publications, Series A: Meteorological Notes.

- No. 1 Rosenan, N.: The measurement of evaporative power in Israel. 1951.
 No. 2 Neumann, J.: Diurnal variation of low cloudiness in summer at two stations situated near coastlines of opposite curvature. 1951.
 No. 3 Climatological Normals, Part One. 1951 (reprinted 1953).
 No. 4 Climatological data for the Negev. 1952.
 No. 5 Klein, M. and Yifrach, Y.: Quantitative forecasting of the daily minimum temperature during the winter months for Lydda Airport, Israel. 1952.
 No. 6 Neumann, J.: Diurnal variation of the subsidence inversion and associated radio wave propagation phenomena over the coastal area of Israel. 1952.
 No. 7 Feige, R.; Koch, W.; Neumann J. and Wittkower, W. J.: Report on the indoor climate of the apartments. 1952.
 No. 8 Krown, L.: Detailed radiosonde analysis in local 12-hour forecasting of precipitation at Lydda Airport. 1953.
 No. 9 Hadas (Vadasz), A.: Soil temperatures at the evaporation station, Lydda Airport, Israel in 1951-52. 1954.
 No. 10. Neumann, J.: Energy balance of an evaporation from sweet water lakes of the Jordan rift. 1954.

Series B: Observational Data.

- Monthly weather report. Published since November 1947 (1948 omitted).
 Annual weather report. Published since 1948.
 Annual rainfall summary. Published since 1947/48.
 Annual dew summary. Published from 1947 to 1952.

Series C: Miscellaneous Papers (Mimeographed).

- No. 1 Bellamy, J. C.: Objective calculations of divergence, vertical velocity and vorticity. Reprinted for internal circulation from the Bulletin of the American Meteorological Society. 1950.
 No. 2 (To be published).
 No. 3. Mané, U.: Climatic characteristics of autumn in Israel. 1952 (in Hebrew).
 No. 4 Schwarz, U.: Rain in summer 1952.
 No. 5 Klein, M.: Quantitative forecasting of the diurnal rainfall for the central coastal area in Israel (first and second interim reports). 1953.
 No. 6 Neumann, J.: Some microclimatological measurements in a potato field. 1953.

Journal of Meteorological Research, Tokyo, Volume 5, Number 6, 1953.

- Sato, Y. and Sekine, Y.: On the flood forecasting of the upper and middle regions of the Tone River. Abukuma, p. 431-437.
 Watanabe, H.: A study of Tsunami in the Sanriku Coast. (1st Report). On the Tsunami caused by the Tosachi-oki earthquake, p. 439-445.
 Kusano, K. and his collaborators: On the forecasting of precipitation over the upper Kitakami Basin. Maximum possible precipitation (2nd Report), p. 447-453.

- Umeda, S.: On the heavy snowfall in Akita Prefecture, p. 455-464.
 Yamashita, H.: A method of weather forecasting by meteorological change near tropopause (2nd Report), p. 465-473.
 Kawazoe, N. L.: On a foregoing phenomenon of "blocking" in neighborhood of Japan, p. 475-480.
 Noguchi, K.: On the nocturnal cooling, p. 481-487.
 Sakai, H.: On the relation between path of traveling anticyclone in spring and air temperature and rainfall amount in summer in Tohoku District (Supplement), p. 489-493.
 Sato, T.: A statistical study of precipitation due to monsoon near Japan (2nd Report), p. 495-500.
 Kon, Y.: On the wind in Tsugary Channel, p. 501-509.
 Ishiyama K. and Sato Z.: On the mechanism of snowfall, p. 511-515.
 Mukade, T.: On the diurnal variation of the wind at Inawashiro, p. 517-524.
 Mano, H.: Sudden increase of nocturnal temperature in valleys or Basins, p. 525-545.
 Kurashige, K.: Wind variation in summer along Kitakami Valley, Iwate Prefecture, p. 547-554.
 Yoshida, S.: On the relation between observed snow depth and the ground area released from snow cover, p. 555-556.

Number 7, August 1953.

- Minegishi, S.: On the structure of the Typhoon Ruth by means of contour-height anomaly analysis, p. 557-573.
 Kato, H.: The analysis of the Typhoon Ruth, p. 575-579.
 Masuda, Y.; Takeuchi, M. and Hashimoto, M.: An aerological investigation of the structure of typhoon (2nd report) Analysis of the Typhoon Ruth, p. 581-586.
 Takahashi, K.: A method of the typhoon movement forecast considering the inertia term, p. 587-595.
 Kubota, S.; Okuta, M.; Asakura, T. and Iida, M.: Distribution of vorticity and path of typhoon, p. 597-604.
 Masuda, Y.; Takeuchi, M. and Hashimoto, M.: On forecasting of the movement of typhoon, p. 605-608.
 Murakami, T.: On the birth place and recurving point of typhoons, p. 609-612.
 Saito, H.: On the tropical storm "Karen," p. 613-620.
 Fuchimoto, H.: On the heavy rainfall due to typhoon in Hokkaido, p. 621-624.
 Syōno, S. and Kasahara, A.: The theory of tropical cyclones. Part I. The physical meaning of the negative vorticity, p. 625-645.

Number 8, September 1953.

- Tohsha, M.: Temperature inversion in the lower atmosphere, p. 649-654.
 Suzuki, E. and Tomatsu, K.: A statistical study on the daily amount of precipitation (Part 1), p. 655.
 Maeda, K.: Harmonic analysis of the diurnal variation of temperature, pressure and height of isobaric surface in the atmosphere, p. 669-679.
 Taguchi, T.: Temperature trend during the recent 50 years, p. 681-691.
 Yajima, Y.: On the rain gauge wind shield, p. 693-699.
 Yamashita, I.: Lake wind on the Lake Suwa, p. 701-702.

Number 9, November 1953.

- Ohtaki, T.: A developed travelling anticyclone, p. 703-711.
 Seshimo, Y.: On the mechanism of a heavy rainfall, p. 712-719.
 Saito, T.: On the zonal index (2nd report), p. 720-723.
 Funada, H.: On the thunderstorm in relation to westerly wave, p. 724-729.
 Hirasawa, K. and Shimada, K.: Forecasting of monsoon in winter season at Tokyo, p. 730-738.
 Miyamoto, M.: Typhoon system and its cellular vortices, p. 739-746.

Journal of Meteorology, Volume 11, Number 3, June 1954.

- Moore, C. B.; Smith, J. R. and Gaalswyk, A.: On the use of constant-level balloons to measure horizontal motions in the atmosphere, p. 167-172.
 Keith, C. H. and Arons, A. B.: The growth of sea-salt particles by condensation of atmospheric water vapor, p. 173-184.
 Neumann, J.: An abridged method for computing daytime and nighttime averages of some meteorological elements, p. 185-188.
 Abdullah, Abdul J.: A proposed mechanism for the development of the eye of a hurricane, p. 189-195.

- Lettau, Heinz: Notes on the transformation of mechanical energy from and to eddying motion, p. 196-201.
- Stidd, C. K.: The use of correlation fields in relating precipitation to circulation, p. 202-213.
- Thuman, William C. and Robinson, Elmer: A technique for the determination of water in soil at temperatures below freezing, p. 214-219.
- Malkus, Joanne Starr: Some results of a trade-cumulus cloud investigation, p. 220-237.
- Buell, C. E.: Some relations among atmospheric statistics, p. 238-244.
- Penndorf, R.: The vertical distribution of Mie particles in the troposphere, p. 245-247.
- Long, Robert R.: Note on Taylor's "ink walls" in a rotating fluid, p. 247-249.
- Adullah, Abdul J.: A note on the tilted-trough model, p. 249-253.
- Austin, J. M.: The forecasting significance of the Reed-Sanders article, p. 253-254.
- Atlas, David: Observations of "warm" showers in Ohio, p. 254-256.
- Dean, Lawrence A.; Jones, Douglas M. A. and Atlas, David: Drop-size history during a rain shower, p. 256-257.
- Crary, A. P.: Revision of high-level wind and temperature measurements in Bermuda, p. 257-258.
- Hess, Seymour L. and Shermann, Leon: Comments on Sherman's horizontal-divergence equation, p. 258.

Marine Observer, Volume 24, Number 165, July 1954.

- Sir Nelson K. Johnson—obituary, p. 121.
- Photographs of ice—Gulf of Pechihli, p. 149.
- Meteorological observations in the North Sea, p. 149.
- The detection of ice by radar, p. 150.
- Southern ice reports, p. 162.
- North Atlantic Ocean weather stations, p. 163.
- New B.B.C. weather bulletins, p. 166.
- South African Weather Bureau, p. 167.

Meteorological Magazine, London, Volume 83, Number 984, June 1954.

- Lempfert, R. G. K.: Some reminiscences of the Meteorological Office of the year 1902, p. 166.
- Jones, D. C. E.: Further investigation of high-level clear-air turbulence, p. 166-173.
- Jenkinson, A. F.: Upper winds from nephoscope observations, p. 174-175.
- Great Britain, Meteorological Office: Meteorological Office discussion. Dynamical forecasting by numerical methods, p. 175-182.
- Harrower, T. N. S. and Evans, D. C.: Paraselene observed at London Airport, p. 184.
- Lawrence, E. N.: Eddies unusually defined by snow, p. 185-186.
- Halo complex, March 2, 1954, p. 186-188.

Meteorologische Rundschau, Volume 7, Number 3/4, March/April 1954.

- de Vries, D. A. and de Wit, C. T.: Die thermischen Eigenschaften der Moorböden und die Beeinflussung der Nachtfrostgefahr dieser Böden durch eine Sanddecke, [The properties of marshy soils and the influence of a sand cover on the susceptibility of soils to night frost], p. 41-45.
- Weger, Nikolaus: Die Wasserbewegung und die Wassergehaltsbestimmung in gefrorenem Boden, [Water movement and water content measurement in frozen soil], p. 45-47.
- Kreeb, Karlheinz: Die Schneeschmelze als phänologischer Faktor, [Snow melt as a phenological factor], p. 48-49.
- Lessmann, Helmut: Singuläre Frostdaten in Südwestdeutschland, [Frost (dates) singular in southwestern Germany], p. 50-54.
- Hartmann, W.: Über einen Zusammenhang zwischen der direkt gemessenen Sonnenstrahlung und der Globalstrahlung, [Relation between directly measured solar radiation and global radiation], p. 54-56.
- Regula, Herbert: Temperaturen und Winde in der Ozonschicht zur Zeit der Oldebroek-Splosion, [Temperatures and winds in the ozone layer during the time of the Oldebroek explosion], p. 57-59.
- Rau, Walter: Gefrierkerngehalt und Gefrierkernspektrum des natürlichen Aerosols, [Freezing nuclei content and freezing nuclei spectra of natural aerosols], p. 59-64.
- Schwerdtfeger, Gertrud: Abhängigkeit des Glycosidgehalts der *Digitalis lanata* von der Witterung, [Dependence of glucoside content in *Digitalis lanata* on weather], p. 64-66.

- Eidgenössische Sternwarte Zürich: **Definitive Sonnenflecken-Relativzahlen für 1953**, [Definite relative sunspot numbers for 1953], p. 66.
- van Eimern, J.: **Über eine Feldmethode zur Bestimmung des natürlichen Wassergehaltes des Bodens**, [Field method for determining the natural water content of soil], p. 66-67.
- Monthly Weather Review**, Volume 82, Number 3, March 1954.
- Johnson, Russell E.: Estimation of friction of surface winds in the August 1949 Florida hurricane, p. 73-79.
- Hawkins, Harry F., Jr.: The weather and circulation of March 1954. A cool March with a 6-day periodicity, p. 80-86.
- Allen, Philip W. and Creash, Vincent J.: Changes in the vertical mass distribution in the vicinity of the rapidly deepening low of March 24-26, 1954, p. 87-95.
- ion Kagaku (Low Temperature Science)**, Sapporo, Japan, Number 10, 1953.
- Oura, Hirobumi: Condensation- and sublimation-nuclei in Wilson chamber, p. 27-38.
- Kuroiwa, Daisuke: Electron-microscope study of fog nuclei (On the condensation nuclei of cloud particles), p. 39-52.
- ilus**, Volume 6, Number 1, February 1954.
- Kientzler, C. F.; Arons, A. B.; Blanchard, D. C. and Woodcock, A. H.: Photographic investigation of the projection of droplets by bubbles bursting at a water surface, p. 1-7.
- Namias, Jerome: Quasi-periodic cyclogenesis in relation to the general circulation, p. 8-22.
- Scorer, R. S.: The use of normals in numerical forecasting, p. 23-26.
- Eriksson, T. O.: A measurement of the winds aloft during a cold front passage, p. 27-31.
- Doport, M.: The cellular solution of the dynamical equations and the actual perturbation of the westerlies up to 16 km at Valencia, p. 32-43.
- Jerlov, N., Olson, H. and Schüepp, W.: Measurements of solar radiation at Lövanger in Sweden during the total eclipse 1945, p. 44-45.
- Fuglister, F. C.: Average temperature and salinity at a depth of 200 meters in the North Atlantic, p. 46-58.
- Post, Louis A.: A practical method for the prediction of the surface currents of the ocean, p. 59-62.
- Báth, Markus: A study of T phases recorded at the Kiruna seismograph station, p. 63-72.
- Brunberg, E. A. and Dattner A.: On the interpretation of the diurnal variation of cosmic rays, p. 73-83.
- Hirvonen, R. A.: The gravimetric method for determination of the form of the geoid, p. 84-88.
- Letters to the Editor*
- Herman, F. A.: [Discussion of: Content of nitrogen ($\text{NH}_4\text{-N}$ and $\text{NO}_3\text{-N}$) in atmospheric precipitation by A. Angström and Högberg.] p. 89.
- Fonselius, S.: Amino acids in rainwater, p. 90.
- Book Review*
- Bolin, Bert: P. Raethjen: **Dynamik der Zyklonen**, [Cyclone dynamics], p. 93-95.
- Shokyo Univ., Science Reports, 5th Series, Geophysics**, Volume 5, Number 2, October 1953.
- Yamamoto, Giichi: Radiative equilibrium of the earth's atmosphere. 1. The grey case, p. 45-57.
- Kato, Yoshio and Takagi, Akio: Further note on the investigation of the changes in the earth's magnetic field accompanying earthquake or volcanic eruption, p. 67-74.
- S. Air Force. Cambridge Research Center, Geophysical Research Papers**, Number 24, November 1953.
- Starr, Victor, P.: Some aspects of the dynamics of cyclones, p. 9-17.
- Lorenz, Edward N.: Displacement and intensification associated with variations of local angular momentum, p. 19-25.
- Kuo, Hsiao-lan: The development of quasi-geostrophic motions in the atmosphere, p. 27-52.
- Battin, R. H.: On the two-dimensional incompressible flow of an inviscid fluid over the earth, p. 53-78.
- White, Robert M.: The horizontal eddy flux of energy across 31°N , p. 79-83.
- Lorenz, Edward N.: A multiple-index for describing atmospheric transport processes, p. 85-87.
- Benton, G. S. and La Seur, N. E.: The space-time distribution of atmospheric eddies, p. 89-97.
- Mintz, Yale and Kao, Shih-kung: The contour-channel method of computing the geostrophic poleward flux of atmospheric properties, p. 99-101.
- Starr, Victor P. and Long, Robert R.: The flux of angular momentum in rotating model experiments, p. 103-113.

Shapiro, Ralph: On the nature of Jovian spots as indicated by their distribution and velocity in 1928, p. 115-122.

Lorenz, Edward N.: The vertical extent of Jupiter's atmosphere, p. 123-127.

Wahl, Eberhard W.: Changes in the general circulation reflected in the occurrence and intensity of weather singularities, p. 129-141.

Weather, London, Volume 9, Number 6, June 1954.

Francis, J. R. D.: Laboratory models of sea surface phenomena, p. 163-168.

Ludlam, F. H.: Large air bubbles in water, p. 169.

von Arx, William S.: A laboratory model of the wind-driven ocean circulation, p. 170-176.

Mortimer, C. H.: Models of the flow-pattern in lakes, p. 177-184.

Frankcom, C. E. N.: Obituary. Commander J. Hennessy, p. 185.

Wetter und Leben, Vienna, Volume 6, Number 1/2, March 1954.

Reichelt, Günther: Über Spätfrostschäden im Grünland in Abhängigkeit vom Relief, Beispiel der Baar, [Late frost damage in the countryside in relation to relief, exemplified by the Baar (Donaueschingen)], p. 1-6.

Lenz, Friedrich: Mückenverbreitung und Wetter, [Mosquito propagation and weather], p. 6-9.

Ruttner, F.: "Invasionen" und vorübergehende Änderungen des Planktonbestandes in Lunzer Seen, ["Invasions" and temporary changes of plankton content in the Lunz lakes], p. 10-12.

Schilling, G. F. and Holzer, R. E.: Über mögliche Zusammenhänge zwischen Bioklimatologie und Luftelektrizität, [Possible relationships between bioclimatology and atmospheric electricity], p. 13-16.

Silhavy, Friederike: Untersuchungen des Keimgehaltes der Luft in Wien, [Investigation on nuclei content of the air in Vienna], p. 16-19.

Rosenkranz, Friedrich: Über die Veränderung phänologischer Daten in den letzten fünfzig Jahren, [Change of phenological dates in the last 25 years], p. 19-21.

Matznetter, Jos.: Über die Lawinentätigkeit an der Arlbergbahn, [Avalanches in Arlberg], p. 21-25.

Zawadil, R.: Der Winter 1953/54 in Wien-Hohe Warte, [The winter 1953/54 in Vienna-Hohe Warte], p. 25.

Topitz, Alois, Bemerkung zur Winterarbeit im Freien, [Remark on winter work in the open], p. 25-26.

Der Winter 1953/54 in Ljubiana, [Winter 1953-54 in Ljubiana], p. 26.

Schreyer, R.: Zur Kritik der Niederschlagsmessung in freier Lage, [The criticism of unsheltered precipitation measurements], p. 26-27.

Hader, Fritz: Kann der Erdbodenabstand der Thermometerhütten verkleinert werden? [Can the space between the ground and the thermometer screen be reduced?], p. 27-31.

Czihak, Gerhard: Eine einfache Methode zur Bestimmung der Feuchtigkeit des Bodens, [A simple method for determining soil moisture], p. 31-37.

Zeitschrift für Meteorologie, Berlin, Volume 8, Number 4, April 1954.

Lange, O.: Die Polarisationsgrösse p in ihrer Abhängigkeit von Instrumenthöhe und Albedo, [The polarisation quantity p in its relationship to instrument height and albedo], p. 97-100.

Würfel, H.: Über den Einfluss der Witterung auf den Menschen, [The influence of weather on man], p. 111-122.

Die Witterung in der Deutschen Demokratischen Republik, Februar 1954, [The weather in the German Democratic Republic, Feb. 1954], p. 123-124.

Weigel, Werner: Luftspiegelung der untergehenden Sonne und grüner Strahl, beobachtet auf dem Brocken am 2. Januar 1954, [Mirage of the setting sun and "green flash" observed at Brocken Jan. 2, 1954], p. 126-127.

Gabler, Horst: Seltene Haloerscheinung in Bodennähe, [Rare halo appearance near ground], p. 127.

LIST OF PERIODICALS

Note: This list contains the titles of the periodicals which regularly contain material on meteorology or related fields and it comprises only a small percentage of the periodicals from which pertinent articles are abstracted.

In this list the preferred form of title entry is given in bold face type. If the title is distinctive, the name and headquarters of the issuing society or organizations follows the title. If the title is not distinctive (for instance, Bulletin, Journal, Trudy, Mitteilungen), the entry consists of the issuing body followed by the title.

PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

- Académie des Sciences, Paris, *Comptes Rendus*.
- Akademiia Nauk SSSR, *Izvestiia*, Ser. Geogr. and Ser. Geofiz., [Moscow].
- American Geophysical Union, Transactions, National Research Council, Washington.
- *American Meteorological Society, *Bulletin*, [Boston].
- *Angewandte Meteorologie, [Potsdam].
- Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
- *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B, [Vienna].
- Australian Journal of Physics, [Melbourne].
- Ciel et Terre, Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels].
- *Geofisica e Meteorologia, Società Italiana di Geofisica, [Genoa].
- Geofisica Pura e Applicata, Istituto Geofisico Italiano, [Milan].
- Geophysical Magazine, [Central Meteorological Observatory, Tokyo].
- *Időjárás, Magyar Meteorológiai Társaság and Országos Meteorológiai Intézet [Budapest].
- *Indian Journal of Meteorology and Geophysics, [Delhi].
- *Journal of Atmospheric and Terrestrial Physics, [London].
- Journal of Geophysical Research, [Washington].
- *Journal of Meteorological Research, [Tokyo].
- Journal of Meteorology, American Meteorological Society, [Boston].
- *Journal Scientifique de la Météorologie, Société Météorologique de France, [Paris].
- *The Marine Observer, Air Ministry, Meteorological Office, London.
- *The Meteorological Magazine, Air Ministry, Meteorological Office, London.
- *Meteorological Society of Japan, Journal, Second Series, Kisho Shushi, [Tokyo].
- *La Météorologie, Société Météorologique de France, [Paris].
- *Meteorologische Rundschau, [Bad-Kissingen].
- *Meteoros, [Buenos Aires].
- *Monthly Weather Review, U. S. Weather Bureau, Washington, D. C.
- Nature, [London].
- Polarforschung, Archiv für Polarforschung, [Kiel, Germany].
- Revista de Geofísica, Instituto Nacional de Geofísica, [Madrid].
- *Revista-Meteorologica, Junta Nacional de Meteorología, Montevideo.
- *Rivista di Meteorologia Aeronautica, Associazione Culturale Aeronautica, [Rome].
- *Royal Meteorological Society, Quarterly Journal, [London].
- Royal Society of London, Proceedings, Ser. B.
- *South Africa. Weather Bureau, Notos, [Pretoria].
- *Tellus, Svenska Geofysiska Föreningen, Stockholm.
- Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, *Izvestiia*, [Moscow-Leningrad].
- *Weather, Royal Meteorological Society, [London].
- *Weatherwise, American Meteorological Society [Boston].
- *Wetter und Leben, Österreichische Gesellschaft für Meteorologie, [Vienna].
- *WMO Bulletin, World Meteorological Organization, [Geneva].
- *Zeitschrift für Meteorologie, Meteorologisches Observatorium, Potsdam.

* Indicates those periodicals which are primarily meteorological

TABLE OF CONTENTS

Meteorological Abstracts and Bibliography, Volume 5, Number 7, July 1954

Foreword.....	iii
Explanations.....	iv

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

Works of Special Interest.....	77
General Meteorology.....	782
Meteorological Observations and Instruments.....	784
Methods of Observation.....	784
Observational Data.....	785
Instrument Carriers.....	786
Instruments.....	787
Synoptic Analysis and Forecasting.....	789
Structure and Physics of the Atmosphere.....	793
Structure of the Atmosphere-Ionosphere.....	793
Mechanics and Thermodynamics of the Atmosphere.....	795
General Circulation.....	797
Atmospheric Disturbances.....	798
Radiation and Temperature.....	799
Radiation.....	799
Air temperature.....	802
Lake Temperature.....	803
Pressure and Wind.....	803
Pressure.....	803
Wind.....	805
Wind Effects.....	806
Upper Air Winds and Vertical Motion.....	807
Aqueous Vapor and Hydrometeors.....	808
Humidity, Evaporation, and Evapotranspiration.....	808
Condensation nuclei.....	809
Fog.....	811
Condensation Trails.....	812
Precipitation.....	813
Rain, Hail and Snow.....	814
Hydrometeorology.....	816
Climatology and Bioclimatology.....	817
Climatology.....	817
Climate of Particular Places.....	818
Climatic Changes.....	820
Bioclimatology.....	821
Environmental Influences.....	822
Air Mass Climatology.....	823
Miscellaneous Applications.....	823
Optical Phenomena.....	823
Electrical Phenomena.....	824
Astrophysics.....	826

PART II. ANNOTATED BIBLIOGRAPHY ON GLOBAL SOLAR RADIATION

Introduction.....	829
Geographic Outline.....	829
Bibliography on Global Solar Radiation.....	831

PART III(A). SPECIAL UNANNOTATED BIBLIOGRAPHY ON CLOUD PHYSICS

856

PART III(B). METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

865

PART IV. AUTHOR AND SUBJECT INDEXES

Index of Authors.....	871
Index of Subjects.....	874
Index of Geographical Locations.....	878

List of Periodicals.....	Cover 3
--------------------------	---------